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Lectures

ON THE

PHYSIOLOGY OF GLYCOGEN

AND THE

RÔLE OF INSULIN AND EPINEPHRINE IN CARBOHYDRATE METABOLISM.

Delivered at the London Hospital

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LECTURE I.

(Delivered on May 16th.)

THE behaviour of the blood-sugar curve following the ingestion of soluble carbohydrates indicates that absorption must start at once. Under ordinary conditions none of this seems to occur in the stomach itself, as far as can be judged by chemical analysis, either of solutions of sugar left for some time in the viscus after ligation at the pylorus or of the chyme as this is discharged into the duodenum. Absorption of sugar takes place mainly in the upper levels of the small intestine, and different types of experiment have been employed to study the process. The oldest of these consists in placing known amounts of sugar in solution in isolated loops of intestine (Thiry-Vella) and then removing and analysing the contents after varying periods of time. The chief objection to this method depends on the fact that only an isolated portion of the entire gut is employed, an objection which is overcome in the method recently introduced by Cori and Cori,[1] in which the entire gastro-intestinal tract of small animals, such as the white rat, is used. The animals, kept for some time previously on a standard diet, are starved either for 24 or 48 hours, after which 2 or 3 c.cm. of a strong solution of sugar is placed in the stomach through a small flexible catheter passed by way of the mouth. The rate of absorption is ascertained by subtracting, from the amount of sugar that was given, the amount found by analysis of the gastro-intestinal contents after killing the animals at varying periods. Cori and Cori state that, when sufficient is given, the amount of sugar absorbed is constant from hour to hour, at least up to four hours, and they define as the coefficient of absorption that number of grammes of sugar absorbed per 100 g. of body-weight per hour. This is characteristic for each sugar, but it varies according to the time the animal was starved prior to giving the sugar. It is independent of the strength of the sugar solution.

For the monosaccharides the coefficients are given as follows: After 48 hours' starvation *d*-galactose 0·196 g., *d*-glucose 0·178 g., *d*-fructose 0·077 g., *d*-mannose 0·034 g., *l*-xylose 0·028 g., and *l*-arabinose 0·016 g. After 24 hours' starvation the coefficient for glucose is 0·266 g. These figures show a high degree of selectivity, dependent not at all upon molecular weight but markedly so on the structure of the molecule. Thus, the pentoses are absorbed at about one-eighth the rate of the better-known hexoses, and the slight stereoisomeric difference between glucose and mannose makes a marked difference. These results stand out in sharp contrast with those obtained for the rate of absorption from the peritoneal cavity, as determined on mice by C. F. Cori and Goltz.[2] In this case the sugar was absorbed at a diminishing rate with time, indicating that the concentration affects the process, and different sugars were absorbed at equal rates. When injected intravenously, different sugars were also found, by analysis of the so-called free sugar of the tissues, to be absorbed very rapidly and at equal rates into the liver and into the muscles, although it took a shorter time for equilibrium between blood and liver to be attained than between blood and muscles dependent probably on differences in the richness in blood-supply.[3]

I have only instanced a few of the numerous results which these workers have placed on record, but they are sufficient to show that the intestinal mucosa is endowed with a very highly specialised selective action, which is absent in the case of certain other absorbing membranes. It seems remarkable that bacterial decomposition should not account for a measurable fraction of the sugar which disappears from the intestine during four hours and that the concentration of the solution should not affect the rate of absorption. Cori and Cori state that no significant amount of glucose disappears when a solution of it is placed in the excised gastro-intestinal tract kept in isotonic saline solution at body temperature for four hours. At my request Magee and Auchinochie have repeated this experiment and on one or two occasions have been able to recover all the glucose. On other occasions, however, there were considerable deficits which may have been due to bacterial destruction or to incomplete washing of the sugar out of the walls of the gut. Is it not possible also that bacterial action might occur in the intact intestine, in situ, but be retarded or absent in the excised one? Corroboration or otherwise of the accuracy of the coefficients of absorption as given by Cori and Cori for different sugars would be most important since their subsequent researches, in which they compare the amount of sugar absorbed, on the one hand, with the amount that can be accounted for by combustion and glycogen formation on the other, depends on it. One also wonders whether the higher coefficients of absorption observed for rats starved 24 hours, as compared with those starved 48 hours, may not have been due to greater bacterial destruction in the former case. It may be added that another of the Cori's conclusions—namely, that the rate of absorption is independent, within wide limits of the sugar concentration, has been called in question by Pierce, Osgood, and Polansky.[4] These workers found, on repeating Cori's experiments, that the rate of absorption was less between the second and third hours than between the first and second. In a reply to this criticism, however, Cori, Cori and Goltz[5] point out that Pierce, &c., did not feed enough sugar to let the absorption proceed for three hours.

Although there may be reasons to doubt the reputed extreme accuracy of the coefficients, it is nevertheless certain that the striking differences observed cannot be mainly attributed to differences in the extent of destruction of the sugars by the bacteria of the intestine. That the hexoses are more readily absorbed than the pentoses has been confirmed by Magee and myself[6] in experiments of a different type from those of the Cori's. In these, we measured the rates of diffusion of equimolecular solutions of various sugars through the walls of isolated loops of rabbit's intestine, kept alive by being suspended in oxygenated Tyrode's solution.

The different sugar solutions were placed in neighbouring loops of approximately equal weight and small portions of the outside solutions were pipetted off at intervals for determination of the reducing power by the Shaffer-Hartmann method. It was found in preliminary experiments that diffusion proceeds through pieces of gut which had previously been killed, either by heat or by the action of sodium fluoride, much more rapidly than through the living gut and that, in equimolecular concentration, pentoses diffuse more rapidly than hexoses, being dependent solely on the concentration of the sugar solution. Through living segments on the other hand, glucose diffused as quickly as pentose, or in some experiments more quickly.

It is undoubted, therefore, that the intestinal mucosa absorbs hexoses more rapidly than pentoses, and I cannot resist wondering whether the former undergo some change in the process. That the blood-sugar may consist of some form of glucose which differs in configuration from a mixture of the α- and β-glucoses, has been suggested by various authors, without any evidence being adduced to support the suggestion. It has, however, generally been assumed that this change, if it occurs, depends either on a

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preliminary conversion of glucose into glycogen or on the action of some hormone such as insulin, but is it not possible, as has been hinted at by various writers, that some change actually occurs in the glucose molecule while it is passing through the intestinal mucosa?

Interpretation of Changes in the Blood-Sugar.

It is not my intention here to enter further into the various interesting questions regarding intestinal absorption which await investigation by these methods, but, confining ourselves to the sugars, it may be of interest if I refer to the significance of the results which we have just been considering in connexion with the behaviour of the blood-sugar following carbohydrate ingestion. When this is observed in man at short intervals, after moderately small amounts of sugar have been taken in the post-absorptive state, very constant results are obtained, and it is considered that any unusual heightening or lengthening of the curve, which is obtained by plotting percentages of blood-sugar against time, is indicative of a diabetic tendency. Useful though this method may be as a clinical test, it should always be borne in mind that numerous factors enter in to influence the behaviour of the curves, for not only does this depend on the rate of intestinal absorption of the sugar, which again is dependent on many factors, but also on the rate at which the tissues utilise the sugar that is absorbed. This disposal may be influenced in several ways, and there is accumulating evidence to show that these are largely controlled by the concentration of insulin in the blood.

How complicated the matter really is may be illustrated by comparison of the blood-sugar curves following ingestion of fructose and glucose. The former sugar has a very small influence as compared with that of the latter and this is used clinically as a test of the efficiency of the liver, on the assumption that the difference depends on a rapid polymerisation of the fructose to glycogen in this organ. If Cori and Cori's results on rats apply in the case of man—namely, that fructose is absorbed at only half the rate of glucose—then it is possible that this may in itself account for the smaller influence which fructose has on the curve. But the problem is really a complex one, since galactose was found by the Cori's to be absorbed even more rapidly than glucose, whereas this sugar, according to Folin and Berglund,[7] has little influence on the blood-sugar level.

When the intestinal factor is eliminated, by injecting intravenously at a slow continuous rate, the tolerance towards sugar may be determined by observing whether any is excreted in the urine. By this method Sansum, Woodyatt, and Wilder[8] showed, several years ago, that 0·85 g. of glucose could be tolerated per kg. body-weight and per hour, both in man and laboratory animals. In the white rat (under amytal anæsthesia) and in the mouse, however, Cori and Cori state that the tolerance is three times as great (2·5 g. per kg.), except during the summer months when there is a lowered tolerance (1·6 g. per kg.) and this was found to be related to the development of a certain degree of ketonuria.

The Glycogen of the Liver.

Physiologists have become so familiar with the view that the glycogen of the liver represents a storage form of carbohydrate, that they have neglected to take notice of many well-established facts which indicate that it is also, in a sense, an internal secretion. As Cramer[9] has pointed out, this was the original conception of Claude Bernard, who believed glycogen to be produced out of protein, not denying, however, that it is capable also of being formed out of absorbed carbohydrate. And at the outset of a discussion of the significance to be attached to variations in the amount of glycogen which can be found in the organ after death, it is important to recognise that this is only a balance between processes of production and loss and may be no measure therefore of the rate at which these processes are proceeding during life; as Cramer puts it, "one should look upon the glycogen of the liver dynamically, and not, as has been done, statically as a mere store of excess of carbohydrate."

When food is withheld, the amount of glycogen in the liver rapidly becomes decreased and then increases again. In the white rat, for example, Barbour, Chaikoff, Macleod, and Orr[10] found the average percentage, in 24 hours after withdrawal of food, to be 0·16 per cent. (average of 48 rats), whereas after 48 hours it was 0·32 per cent., and these figures have, in general, been confirmed by Cori and Cori. Hershey and Orr[11] found that a steady increase occurs during later periods of starvation, although the values for individual rats were observed to be less constant than for those killed after 24 or 48 hours. The increase can be seen from the following results of an observation in which three rats were killed at each period.

	Per cent.
After 72 hours' starvation	0·21 and 0·21
„ 96 „ „	0·65, 0·23 and 0·34
„ 120 „ „	0·42, 0·23 and 0·92
„ 144 „ „	0·78, 0·78 and 0·78

These results confirm those previously obtained by Pflüger on the dog in showing that a new formation of glycogen, or gluconeogenesis, is occurring in the liver during starvation. Protein and fat are the only known sources for this glycogen, and there are many who believe that the former is alone available, but this question does not concern us here.

Although it has been recognised for some time that starvation alone does not cause all the liver glycogen to disappear, it is usually taught that this occurs when the fasting animal is made to perform muscular exercise. But Hershey and Orr have been unable to confirm this. Again using the white rat, these workers induced muscular exercise, either by causing the animals to work until exhausted on a treadmill, or by making them swim, with short intervals of rest, in cold water, every precaution being taken to see that the time elapsing between termination of the exercise and removal of the liver was as short as possible. The preliminary fasting period was 24 hours and, in order to rule out all chances of error, a litter mate, left fasting at rest, was used as a control in each observation. The following are typical results:

	Glycogen per cent.
After 2 hours' exercise the liver contained	0·16
And that of the control rat	0·16
After 3 hours' exercise the liver contained	0·16
And that of the control rat	0·20
After 6 hours' exercise the liver contained	0·14
And that of the control rat	0·14

The liver of a rat which ran on the treadmill for 23 hours still contained 0·20 per cent. glycogen.

In none of these experiments was it possible to induce any greater reduction in liver glycogen by muscular exercise than by fasting alone. Corresponding results were obtained in the rats which were made to swim in cold water. Thus, in two rats that were in the water off and on for a period of 90 minutes, following a fast of 24 hours, the percentages of glycogen were 0·17 and 0·18.

Before concludiug that it is impossible to rid the liver of glycogen by starvation combined with muscular exercise, it was decided to repeat the observations by what is usually considered to be an infallible method for this purpose—namely, by inducing strychnine convulsions while the animal is under artificial respiration. In three rabbits, deprived of food for 48 hours and then injected with sufficient strychnine to induce convulsions for periods of 38, 44, and 57 minutes, the liver contained 0·09, 0·06, and 0·08 per cent. of glycogen respectively, and in other observations of a similar nature still larger amounts were found. These results show that the glycogen of the liver is of much greater metabolic significance than is implied in the notion that it represents a storage form of carbohydrate.

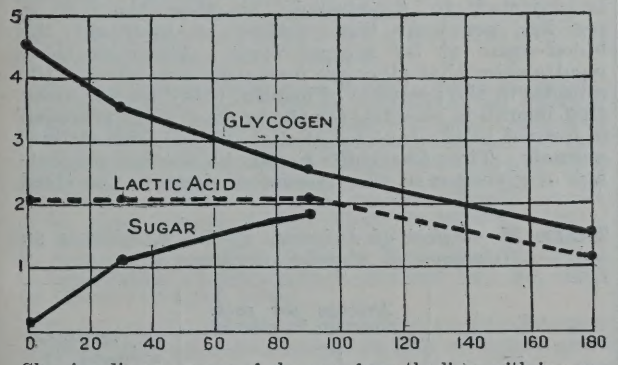
In pathological conditions, also, it is questionable whether all traces of glycogen ever disappear from the

liver; at least we have always succeeded in demonstrating its presence in the liver of completely depancreatised and fasting animals several days after they had been rendered diabetic by removal of insulin. Bordering on the pathological are those conditions established after repeated injection for a week or so of thyroid extract. Cramer and Krause[9] found that the glycogen in the liver became so far reduced, even when carbohydrate food was given during the thyroid injections, that its amount could not be estimated by the Pflüger-Bertrand method, and this has been confirmed by Kuriyama[12] and by Burn and Marks,[13] but probably some traces were present. It is important that it is only after the thyroid hormone has been repeatedly injected for some time that the glycogen almost disappears. During earlier stages no change occurs in the actual amount of glycogen in the liver, although it appears to be more readily convertible into sugar, as judged from its behaviour after injecting insulin or epinephrine. Thus, it requires very large doses of insulin to lower the blood-sugar, but only very small ones of epinephrine to raise it. These results suggest that it is not alone the percentage of glycogen in the liver that determines the readiness with which this organ may discharge sugar into the blood, but also the sensitivity of the glycogenolytic mechanism.

Of course, it would be dangerous to affirm that the liver can never be entirely cleared of glycogen, but for the present we must regard this substance as an essential intermediary in liver metabolism.

Considerable attention has in the past been given to the disappearance of glycogen from the liver which occurs immediately after death—the so-called post-mortem glycogenolysis—but it is not my intention to enter into this subject further than to allude to an interesting difference between the process in the liver and that in the muscles. The actual amount of glycogen which disappears in a unit of time under similar conditions is very much alike in both cases, but the

FIG. 1.



Showing disappearance of glycogen from the liver with increase of free sugar and decrease of lactic acid. (Lactic acid in parts per 10,000; glycogen and sugar in parts per cent.)

substances which are formed from it are different. As the glycogen disappears from the liver, free sugar increases and there is no increase in lactic acid (see Fig. 1), whereas in muscle there is no increase in free sugar but lactic acid ultimately accumulates almost in proportion to the glycogen which has disappeared (Macleod and Simpson[14]). (Compare with Fig. 3.) We will again have occasion to refer to the significance of these results.

Accumulation of Glycogen in the Liver.

Turning now to the conditions which cause glycogen to accumulate in the liver, we again find that the storage hypothesis is entirely inadequate. Perhaps the results which show this most convincingly are those obtained, first of all by Pollak[15] and later by Markowitz,[16] as a result of injecting epinephrine repeatedly into animals after the glycogen of the liver had been reduced to a minimum, through fasting and strychnine. Each injection of epinephrine was followed by hyperglycæmia, and after the injections had been repeated many times during several days, the liver was found to contain considerable amounts of glycogen. This is shown in Table I.

We shall see in the succeeding lecture that Cori and Cori have attempted to explain this result as dependent on a transfer, or shift, of glycogen from muscles to liver, but even if this were to account for the glycogen

TABLE I.—*Glycogen in Rabbits after Repeated Injections of Epinephrine.*

No.	Days (*a*)	Glycogen (per cent.).			Remarks.
		Liver.	Heart.	Muscle.	
7	5	0·33	0·536	0·14	Prior to injection withheld for 5 days and strychnine injected.
28	8	0·16	0·234	0·13	Ditto (4 days).
8	5	0·98	0·44	0·19	Ditto (5 „).
22	9	1·05	0·100	0·26	Ditto (5 „).

(*a*) Days on each of which from 3–5 c.cm. 1–1000 adrenalin injected in frequent doses.

accumulation following one injection of the hormone, it certainly could not do so for that remaining after repeated injections during several days.

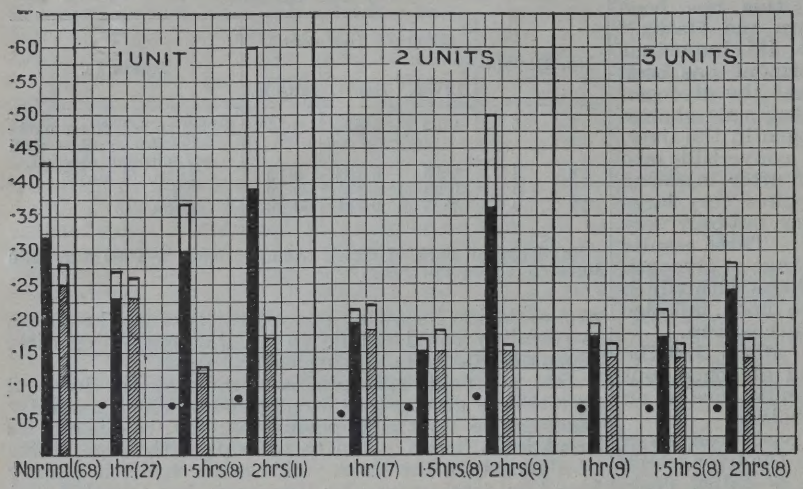
But although epinephrine stimulates the internal secretion of glycogen in fasting animals it is generally regarded to do the opposite—namely, to hasten its breakdown when given to animals with large stores of glycogen in the liver. This latter belief is mainly based on experiments by Ritzmann, but Olmsted and Coulthard[15] found it very difficult in the spinal cat to obtain corroborative evidence. It was only when the preparation was allowed to stand for some hours after decapitation, so as to get rid of all anæsthetic from the blood, that they were able, by actual measurement of glycogen in small pieces of liver, to demonstrate that a decrease in percentage occurred as the blood-sugar rose. In view of these results, this hormone must be regarded as having a reversible action, causing glycogen to be deposited in the liver when none is there and to be broken down when abundance is already present. The other hormone which most definitely has an influence on carbohydrate metabolism—namely, insulin—exhibits similar reversible effects, although the procedures necessary to demonstrate them are different in detail. Thus, when insulin is given without food to fasting white rats it first of all causes the glycogen content of the liver to become reduced, but this is followed by an increase, provided a convulsive dose has not been given. This is shown in the accompanying chart (Fig. 2) and will be referred to again when we come to consider the action of insulin. Reversible effects of insulin are also seen by comparing its action on normal and diabetic animals. When it is given along with food to normal animals, glycogen is always deposited in the liver much more slowly than after food alone, as will be shown later, whereas there is an invariable and often a marked increase in liver glycogen when insulin is injected into diabetic animals, both when food is also given and when it is withheld.

Although the observations which we have just considered, as well as those of Cramer, show quite clearly that glycogen must be produced in the liver cells out of non-carbohydrate material, by some sort of secretory process, it must not be lost sight of that it can also be deposited in them by condensation of glucose, and other hexose monosaccharides, carried to the viscus by the blood. At least, this is the simplest way by which the gradual increase in glycogen percentage can be explained when food rich in carbohydrate is fed to a previously fasted animal. In our observations of this type on white rats it was noted that the increase in glycogen was usually less marked during the first hour or so after feeding than later, the maximum, of about 4 per cent. being reached in approximately four hours. This retarded onset in glycogen deposition may possibly depend upon an unpreparedness of the liver to condense the sugar;

it cannot be due to inadequacy of a supply of blood-sugar, since this begins to mount within a few minutes of feeding the rats and, in our experiments, had reached the peak in at least one hour after feeding, and probably much earlier.

Many factors may come into play in the formation of glycogen in the liver and some of these, such as the presence of insulin and epinephrine, we will discuss more fully later. Others concern the chemical structure of the carbohydrate present in the circulating blood, but inasmuch as the observations have been mainly restricted to the liver of cold-blooded animals they do not concern us here. A decided increase in glycogen occurs in the liver in the spinal cat, especially during the first hour or so after decapitation. Olmsted and Coulthard,[17] who discovered this, could give no suggestion as to what the precursor of the glycogen might be, although the blood-sugar, meanwhile falling, was no doubt partly responsible. Recently Cori and Cori,[18] finding that *d*-lactic acid readily forms glycogen in the liver when given to rats, by feeding or injection, have attributed the result to *d*-lactic acid coming from the muscle glycogen. The only difficulty in this explanation is that the glycogen remains unchanged in the muscles of the spinal cat, according to Best, Hoet, and Marks.[19]

FIG. 2.



Influence on glycogen, in white rats, of varying amounts of insulin injected after 48 hours' fasting. Ordinates, per cent. glycogen; abscissa, times of killing after injection; black columns, liver; cross-hatched columns, muscles. Numbers in brackets give number of animals averaged in each case, and the unshaded portion of each column, the percentile error. Black dots, blood-sugar percentage.

THE GLYCOGEN OF THE MUSCLES.

Turning now to the glycogen of muscle, which has come to occupy so important a place in physiology, let us consider first of all the question of its formation. This seems to be mainly dependent on the sugar of the blood, which may be derived either from the break-down of liver glycogen or more directly from absorbed glucose. Some puzzling facts have recently been brought to light concerning the influence of the liver. After this organ has been removed in the dog the muscle glycogen steadily declines, Mann and Magath[20] finding that it was on an average 0·3 per cent. immediately after the hepatectomy, and 0·15 per cent. four hours later. Curiously enough, this diminution does not occur when the liver is practically eliminated from the circulation in the spinal cat, by ligation of the portal blood-vessels along with removal of the remaining abdominal viscera. In both groups of experiments the percentage of blood-sugar falls, but it is possible that it does so relatively less rapidly in the eviscerated preparation, on account of a leakage of sugar from the liver through the patulous hepatic veins. But even if we allow for this leakage of sugar, it is difficult to account for the constancy in the glycogen of the muscles of the eviscerated preparation since, though not visibly contracting, they are meanwhile producing heat at the rate of at least 2 calories per kg. of body-weight and per hour. If the immediate fuel for this combustion is the glycogen of the muscles, as is the present-day teaching, then we must imagine that glycogen is being built up in each muscle at a rate which is just exactly the same as that at which it is being broken down, and that its source is, in large part, the sugar which is escaping into the blood from the liver, since the total amount of sugar originally present in the blood is far from sufficient to account for the energy expended.

Best, Hoet, and Marks[19] have shown that when glucose is added to the blood of the eviscerated preparation, no glycogen is formed in the muscles unless when insulin is injected along with the sugar. On the other hand, Choi[21] has shown that when the glucose injections are made into an animal from which the abdominal viscera have not been removed, glycogen is formed in the muscles, this being dependent upon the insulin secreted by the pancreas, since no glycogen formation occurs in animals from which this organ, but not the liver, has been removed some hours preceding hepatectomy. This is shown in Table II. It is no doubt for the same reason that the fall in glycogen in the muscles of hepatectomised dogs is prevented when glucose is injected intravenously, but according to Mann and Magath[20] much more glucose must be injected to accomplish this than the 0·25 g. per kg. per hour that suffices to maintain the blood-sugar at its normal level. Although these results show that glycogen formation can occur in the muscles in the presence of insulin, this does not mean that insulin is essential for the process, since glycogen is formed in the muscles of diabetic (depancreatised) animals. Thus Chaikoff[22] found the average percentage of glycogen in the muscles of dogs on the third day of acute diabetes (caused by withdrawal of insulin from previously depancreatised animals) to be 0·425 per cent., and on the fifth day 0·350 per cent. During this interval at least 2 calories per kg. an hour were used, so that a dog of 7 kg. (about the average of the animals used) would have expended at least $2 \times 7 \times 48 = 672$ calories, representing about 160 g. of carbohydrate, in the two days, and for this, large quantities of muscle glycogen must have been formed, unless we assume that other substances than glycogen can serve as the fuel for energy production in muscle. We cannot say what factor may be responsible for glycogen formation in the muscles when there is no insulin available in the body, but it would seem most likely that it depends in some way on the liver. In other words, the material which is

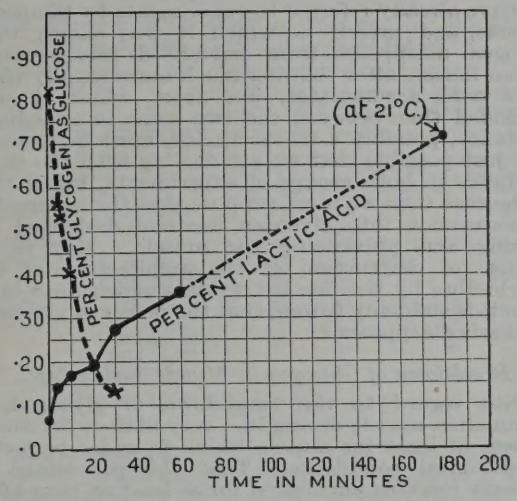
TABLE II.—*Effect of Injection of 3·5 g. Glucose on Glycogen of Muscles in Spinal Cat.*

—	Average per cent. glycogen in muscles.		No. of expts. averaged (3 muscles in each).
	Before injection.	After 2½ hours' injection of glucose.	
Eviscerated	0·685	0·689	6
Abdomen intact ..	0·516	0·570	3
Depancreatised ..	0·477	0·466	3

used for glycogen formation in the muscles when no insulin is present may be glucose that has passed through a glycogen stage in the liver or has been manufactured in this viscus, or even in the muscles themselves, by a process of gluconeogenesis.

In so far as experimental evidence goes at present, however, the only way by which glycogen can be

FIG. 3.



Decrease of glycogen and increase of lactic acid in mammalian muscle after death.

formed in the muscles of an eviscerated preparation is by injection of glucose in the presence of insulin. Fraser and I, using this preparation, have tried to find some carbohydrate derivative which would form glycogen in the muscles independently of this hormone, but without success except in one experiment in which di-hydroxyacetone was injected.

These substances have been fructose, *r*-sodium lactate, di-hydroxyacetone and glycogen hydrolysed by diastase, so as to form a mixture of dextrine and sugar. Solutions of them were injected continuously into the femoral vein during periods of several hours without causing the glycogen percentage of certain selected muscles of the fore and hind legs to become increased over the percentages found present in the same muscles excised before the injections began. An unsuccessful attempt was also made in these experiments to demonstrate a possible influence of the liver, by adding to the glycogen solutions extracts prepared from this organ by faintly acidulated water.

During fasting, in the white rat the muscle glycogen steadily declines for between 24 and 48 hours, after which it remains at a constant level at least for several days. When food is given at this stage the glycogen does not, as a rule, begin to increase until after an hour or so (as illustrated in Fig. 5, Lecture II.), although absorption of glucose has been for some time sufficient to raise the blood-sugar level considerably. This latency may be dependent on inability of absorbed glucose to form muscle glycogen, either until after it has passed through a glycogen stage in the liver or until it has stimulated the pancreas to secrete sufficient insulin so as directly to affect the process of glycogen formation in the muscles. In connexion with the former possibility, it is to be remembered that glycogen formation in the liver itself does not increase much during the first hour after sugar is given to fasting animals.

The impossibility of detecting glycogen formation in mammalian muscle which has been isolated from the influence of the abdominal viscera stands out in contrast with the glycogen formation which Meyerhof and others have demonstrated to occur in isolated frog muscle under certain conditions. This result, like others, makes it probable that there are considerable differences in the chemical mechanism of amphibian, as compared with mammalian, muscle.

Breakdown of Glycogen in Muscle after Death.

Before turning our attention to the question of glycogen utilisation in the muscles, it may be well here to refer to a series of observations regarding the behaviour of glycogen in mammalian muscles after death. It is usually assumed that glycogenolysis sets in immediately, but although this is the case when the muscle has been injured, we have found that the contrary is the case for undamaged muscle. The most rapid onset of glycogenolysis occurs when the muscle is first of all frozen and then ground up into small pieces. Thus Simpson and I found,[14] when we allowed the frozen muscle powder to thaw, that practically all glycogen disappeared from it in from 20–30 minutes. Even when the temperature after thawing was not allowed to rise more than a few degrees above freezing-point, the disappearance of glycogen was very rapid, and it was also found that lactic acid did not increase nearly so quickly as the glycogen disappeared. These changes are shown in the accompanying curves (Fig. 3), which are taken from more recently performed experiments done along with Thomas. It will further be noted from these curves that lactic acid went on accumulating in the muscle suspension long after all the glycogen had disappeared. In the curve shown, the lactic acid failed to reach the amount represented by the glycogen to start with, but in other experiments it sometimes exceeded this. The irregularity of the result in this respect may indicate the operation of some as yet unknown influences on the change. The interpretation which we have put upon these results is that some substance is formed between glycogen and lactic acid, and it is possible that the presence of this in the muscle to start with accounts for the excess of lactic acid which was sometimes found after longer standing. We have been unable to demonstrate the nature of this intermediary substance. It is apparently not sugar since little increase could be detected in the reducing power of a 70 per cent. alcoholic extract of the muscle mixture by the time the glycogen had all disappeared. There was also no change in free phosphate, using the Doisy-Bell method, and we have been unsuccessful in correlating the disappearance of glycogen with breakdown of phosphagen. We suspect

TABLE III.—*Percentile Change in Glycogen at Varying Intervals after Death.*

—	Time left after death.		Change per cent. in glycogen.			Condition of muscles.
			Sartorius.	Gracilis.	Gastrocnemius.	
	hrs.	mins.				
Rabbit.	—	40	—4·2	No change.	+10 h.c.	Soft, pink, irritable.
	2	—	—54	—16	+2 h.c.	Greyish, irritable.
	4	10	—84	—79	—63	Opaque, very slightly irritable.
Cat	2	30	—34	—14	—2·5	Irritable.

h.c. = higher than control.

that this intermediary substance may be some carbohydrate, perhaps a trisaccharide, which is destroyed by 30 per cent. KOH and is insoluble in 70 per cent. alcohol. I have already alluded to the different results obtained with liver under similar conditions.

As these researches were in progress, Orr and his associates noted that there was very little, if any, difference in the percentage of glycogen in the muscles removed from rats that had been dead an hour or so, as compared with that in muscles removed immediately after killing. This observation led to a special study by Miss Mackay[23] of the behaviour of glycogen in intact muscle, in which she compared the percentages in certain muscles removed under ether anæsthesia from one limb (in rabbits) with those of the corresponding muscles from the opposite limb removed at varying

periods after death. The results are summarised in Table III. in which the changes in glycogen at the periods indicated after death are expressed as a percentage of the amounts present in the corresponding muscles immediately before death.

It can be seen that post-mortem glycogenolysis in intact muscle is very slow compared with that occurring in pulverised muscle, that its rate varies considerably in different muscles, and that the glycogen, instead of decreasing, may actually increase in amount. Incidentally, it was observed by Miss Mackay that the irritability of the muscles towards electrical stimulation persisted longer in those which had been dissected free from the surrounding tissues and kept moistened with gauze soaked in Ringer's solution than in muscles left in situ without any dissection. The onset of rigor was also delayed in the dissected muscles. The most noteworthy result was, however, the apparent increase in glycogen observed especially in the gastrocnemius muscles. Since this was not very marked, however, it might signify nothing more than a relative increase due to blood having drained out of the muscle after death. In more recent experiments which Fraser and I have performed, this possibility has been ruled out, since we did not remove the muscles from the left leg until immediately after death.

Rabbits killed either by chloroform or by stunning were used. Certain muscles were then dissected from the left leg, and after leaving the carcass for an hour at room-temperature, the corresponding muscles of the right leg were removed. Table IV. shows some of the results, and in this case these are given in actual percentages, as well as in percentile changes.

TABLE IV.

No.	Muscle.*	Glycogen. Per cent.		Percentile change + or —	Lactic acid. Per cent.	
		Left.	Right.		Left.	Right.
31	T.a.	0·69	0·83	+ 20	0·21	0·27
	G.	0·61	0·65	+ 7	0·1	0·33
33	T.a.	0·55	0·44	— 20	0·05	0·07
	G.	0·54	0·52	— 4	0·04	0·07
35	T.a.	0·31	0·44	+ 40	0·05	0·22
	G.	0·34	0·41	+ 22	0·07	0·19
38	T.a.	0·60	0·75	+ 25	0·07	0·11
	G.	0·70	0·89	+ 27	0·10	0·18
39	T.a.	0·28	0·29	+ 5	0·08	0·12
	G.	0·24	0·20	— 23	0·09	0·12
40	T.a.	0·31	0·65	+110	0·07	0·09
	G.	0·42	0·29	— 32	0·06	0·11

* The animals were killed by chloroform, but similar results were also obtained in those killed by stunning.

T.a. = tibialis anticus; G. = gastrocnemius.

The usual variability, both in the glycogen content of corresponding muscles in different animals and in that of different muscles in the same animal, is seen, but in only one animal was the percentage less in one hour after death in both of the muscles examined. It is possible that corresponding muscles of the two sides did not contain the same percentages of glycogen at the time of death, and this will require further investigation. In the light of observations on other animals than the rabbit it has been assumed that the percentages are alike. We also determined the percentage of lactic acid, using for this purpose the modified permanganate oxidation method after removal of sugar from an alcoholic extract of the muscle, by means of copper sulphate and milk of lime. An increase is evident in all cases, but no relationship can be detected between either the glycogen percentage to start with or the extent of the post-mortem increase in glycogen and the increase in lactic acid.

These results, which it may be stated are not dependent upon any changes in the water content of the muscles, suggest the presence of some hitherto unknown precursor from which both glycogen and lactic acid are derived. This must either break down first of all into glycogen, lactic acid being formed at an independent rate out of the general store of glycogen, or it must be a substance from which both glycogen and lactic acid are formed. In the former case, the substance would be a larger molecule than glycogen, whereas in the latter, it would be a smaller one and might be a lower dextrine or some poly-saccharide, perhaps a tri-saccharide. We have so far been unsuccessful in demonstrating any change in the free sugar of the muscle extractable by alcohol, but this may be because we used strong alcohol in preparing the extracts.

I have already referred to experiments by Simpson, Thomas, and myself in which it was shown that glycogen disappears from pulverised frozen mammalian muscle after thawing much more rapidly than lactic acid accumulates, and from which it was concluded that between the two some intermediary substance, possibly a tri-saccharide, must be formed. It is just possible that we are dealing with the same substance in both groups of experiments, but if this be the case then we must suppose that the agency for its conversion into glycogen becomes destroyed by freezing and pulverising the muscle. May it be because of destruction of the architecture of the muscle-fibre by the fine ice crystals which form in it when it is suddenly frozen, that the power of glycogen synthesis disappears?

Breakdown of Glycogen in Muscle during Life.

With regard to the breakdown of glycogen in mammalian muscle during life, very little is definitely known, at least for muscle which is under perfectly physiological conditions. That the percentage of glycogen remains unchanged for at least an hour after the blood pressure has been reduced to zero makes one wonder whether its failure to rise in the muscles of an eviscerated preparation, even when excess of glucose is present in the blood, may not indicate that a part of the glycogen-forming powers have disappeared, although they can be stimualted in the presence of an excess of both insulin and sugar.

It has been known for long that the glycogen becomes reduced when the muscles contract, and, of the older experiments, I need only recall here those of Manché[24] and Chandelon,[25] who compared its amount in the muscles of one leg, paralysed by cutting the nerve-supply, with those of the opposite leg in which there had been more or less activity. An experiment of this type more recently performed is that of Best, Hoet, and Marks,[19] who, by injecting convulsive doses of insulin into cats in which the sciatic nerve of one leg had been severed, found that the glycogen content of the paralysed muscles remained high, while it became very low in those undergoing contractions. Incidentally, it may be remarked, these results also show that the glycogen of one set of resting muscles cannot be drafted, by way of the circulation, to provide glycogen for an active set, even although the demands of the latter may be urgent. In the light of these results and also those obtained on isolated frog muscle, it is to be expected that glycogen will decrease when mammalian muscle is stimulated. Some results obtained by Miss Mackay will illustrate this.

In the decapitate cat three muscles were dissected from the left leg, and the corresponding ones of the right leg were then stimulated electrically, either through the nerve or directly. The extent of reduction in glycogen, calculated as a percentage of the amount originally present in the resting muscles, is shown in Table V.

Even a few moments of activity is seen to be associated with a decided reduction in muscle glycogen, and this becomes more marked as activity is maintained.

In these experiments the liver was still intact and it contained a rich supply of glycogen, owing to previous feeding of the animals with sugar. Had the liver been absent it is probable that the glycogen would have become more rapidly reduced by activity, and it was the original intention of the research to study this possible influence of the liver. With this in view Miss Mackay performed several experiments in which the muscles in animals with the liver intact and containing much glycogen were left at rest for an

hour or so after stimulating them, but the extent to which the glycogen reappeared, as judged by comparison with the results shown in Table V., was very limited, if any really occurred. I have formed the impression, both from these experiments and from those more recently performed by Fraser and myself, that the failure to demonstrate decided glycogen formation in the muscles of the spinal preparation unless when insulin is present in excess is due to the low blood pressure.

TABLE V.—*Percentile Fall in Glycogen in Stimulated Muscle with its Blood-supply Intact.*

Time of stimulation.	Method of stimulation.	Fall in glycogen (in per cent. of amount found in control muscle).		
		Sartorius.	Gracilis.	Gastrocnemius.
St.*	Directly on muscles.	100	81	94
30–40 mins.	,,	81	62	75
5 mins.	,,	43	36	35
2 ,,	Through foot and thigh.	38	—	25
1 min.	Directly on muscle.	43	—	—
1 ,,	Through foot and thigh.	20	—	—

* St. = Stimulated till muscle would contract no longer.

Finally, something must be said concerning the behaviour of the muscle glycogen in white rats after varying degrees of exercise, either on a treadmill or by swimming in cold water. I have already alluded to the behaviour of the liver glycogen in these experiments. Table VI. shows the results for the muscles.

TABLE VI.—*Glycogen (average per cent.) in Muscles of Fasting White Rats after Exercise (with Controls). Fasting Periods 24 Hours.*

Duration of exercise.	Exercised rats.	Control rats.	No. used.	Duration of exercise.	Exercised rats.	Control rats.	No. used.
1 hr.	0·26	0·28	2 and 4	3 hrs.	0·26	—	1*
,,	0·24	0·30	3 and 3	6 ,,	0·27	0·27	1 and 1*
,,	0·27	0·37	3 and 3	7 ,,	0·20	0·24	1 and 1
,,	0·28	—	6	23 ,,	0·10	0·18	1 and 1
2 hrs.	0·26	0·27	1 and 1	Sw.	0·07	—	1
2½ ,,	0·11	0·28	1 and 1	1½ hrs.	0·05	—	1
3 ,,	0·24	0·37	1 and 1				

Sw. = Swimming. * Rat lost 4 g.

It is seen that even prolonged exercise in the rat does not depress the muscle glycogen very much, a result which stands out in contrast with that obtained by artificial stimulation of the muscles of a spinal preparation. With the exception of those that were made to swim in cold water off and on for 1½ hours, the rats may be said to have been in a "steady state" of activity without having been markedly exhausted at the end of it. Nevertheless, running on a treadmill for several hours is strenuous enough work for a rat. The results show that in the steady state of muscular activity, not only are the oxygen requirements of the acting muscles continuously provided for but those of glycogen as well. Glucose derived from the glycogen of the liver no doubt furnishes the raw material for the reconstruction of much of this glycogen in the muscles, but it is possible that some is also manufactured in the muscles themselves out of protein and fat. I can see no way for putting this possibility to the test of experiment, but it is significant that the percentage of blood-sugar, even after the longest periods of exercise, was practically the same in the exercised rats as in the controls. It was certainly not lower. Taking the results of both groups of experiments together, it would appear that it is only when muscular activity is so strenuous that the oxygen-supply cannot keep pace with the demands that the glycogen is significantly lowered. This would presumably be the case in muscles of the spinal cat when they are artificially stimulated and also in those of intact animals injected with strychnine or with large doses of insulin. In seven rabbits given convulsive doses of strychnine, Hershey and Orr found that the muscle glycogen averaged 0·064 per cent., the lowest value obtained after convulsions had lasted for 57 minutes being 0·03 per cent. It is worthy of note that some glycogen was always found present.

BIBLIOGRAPHY.

1. Cori, C. F.: Jour. Biol. Chem., 1925, lxvi., 691.
2. Cori, C. F., and Goltz, H. L.: Proc. Soc. Exp. Biol. and Med., 1925, xxiii., 122.
3. Same Authors: Ibid., 1925, xxii., 124.
4. Pierce, H. B., Osgood, H. S., and Polansky, J. B.: Ibid., 1929, xxvi., 347; and Jour. of Nutrit., 1929, i., 247.
5. Cori, C. F., and G. T., and Goltz, H. L.: Proc. Soc. Exp. Biol. and Med., 1929, xxvi., 433.
6. Magee, H. E., and Macleod, J. J. R.: Proc. Physiol. Soc., January, 1929; Jour. Physiol., 1929, lxvii., 17.
7. Folin, O., and Berglund, H.: Jour. Biol. Chem., 1922, li., 213.
8. Woodyat, R. T., Sansum, W. D., and Wilder, R. M.: Jour. Amer. Med. Assoc., 1915, lxv., 2067.
9. Cramer, W., and Krause, R. A.: Proc. Roy. Soc. B., 1913, lxxxvi., 550; also Cramer: Brit. Jour. Exp. Path., 1924, v., 128.
10. Barbour, A. D., Chaikoff, I. L., Macleod, J. J. R., and Orr, M. D.: Amer. Jour. Physiol., 1927, lxxx., 243.
11. Hershey, J. M., and Orr, M. D.: Trans. Roy. Soc. Can., 1928, Sec. v., 151.
12. Kuriyama, S.: Amer. Jour. Physiol., 1917, xliii., 481.
13. Burn, J. H., and Marks, H. P.: Jour. Physiol., 1925, lx., 131.
14. Macleod, and Simpson, W. W.: Jour. Physiol., 1927, lxiv., 256.
15. Pollak, L.: Archiv f. exp. Path. u. Pharm., 1909, lxi., 149 and 166.
16. Markowitz, J.: Amer. Jour. Phys., 1925, lxxiv., 22.
17. Olmsted, J. M. D., and Coulthard, H. S.: Ibid., 1928, lxxxiv., 610.
18. Cori, C. F., and G. T.: Jour. Biol. Chem., 1929.
19. Best, C. H., Hoet, J. P., and Marks, H. P.: Proc. Roy. Soc. B., 1926, c., 32.
20. Mann, F. C.: Ergebnisse d. Physiol., 1925, xxiv., 379.
21. Choi, Y. O.: Amer. Jour. Physiol., 1928, lxxxiii., 406.
22. Chaikoff, I. L.: Jour. Biol. Chem., 1927, lxxiv., 203.
23. MacKay, M. E.: Trans. Roy. Soc. Can., 1928, Sec. V., 329.
24. Manché, E.: Zeit. f. Biol., xxv., 163.
25. Chandelon, Th.: Archiv f. d. ges. Physiol. (Pflüger), xlii., 626.

RADIUM TREATMENT BY THE IMPLANTATION OF SCREENED SEEDS.

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IT is now some two years since radium treatment by the method of implanting screened seeds containing radon was introduced into England. The rapidity with which this technique has made a place for itself among the longer established method of applying radium is attested by the number of papers in this and other journals in which cases so treated are described in considerable detail. In the Medical Research Council's report on the work done in certain hospitals during the year 1927 we find but one reference to the implantation of platinum radon seeds, but in Gask's Hunterian Lecture, delivered in January of last year, the method is described at length, as it is also in earlier publications of this speaker and a number of others, notably Gosse and Chester-Williams, and Stanford Cade. The general plan of treatment and its results in a rather limited field are thus fairly familiar to readers of THE LANCET. It has, however, a far wider range of usefulness, and it has seemed possible that some suggestions along this line from its originator might be of general interest to the British medical profession.

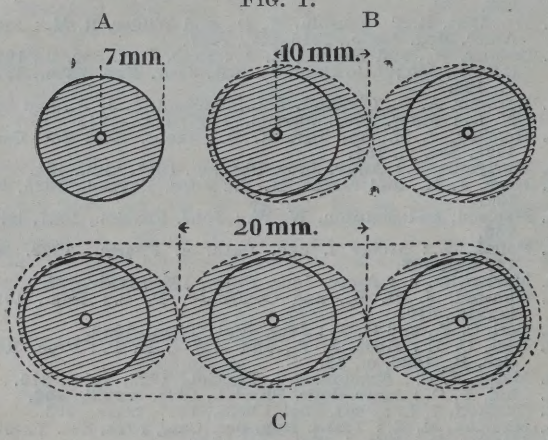
Advantages of the Screened Seed.

The advantage of the implantation method as compared with surface applications are too well known to need any amplification here. Those which the seed screened with platinum possesses over the unscreened or "bare tube" and the gold container of radon are perhaps less generally comprehended. The bare tube offers no obstacle to the passage of caustic

beta radiation. Therefore a zone of necrosis invariably forms about each implanted seed. By using very minute quantities of radon in each seed the amount of this necrosis can be greatly reduced, but it can never be entirely eliminated. Moreover, when the amount of beta radiation is limited, an equal limitation is placed upon the therapeutic gamma radiation available from the same source, so that effective dosage is proportionately reduced. To offset this, a great number of these small containers must be used in a given neoplasm in order to ensure adequate dosage.

The gold seed as produced in the United States for the past three years substitutes gold for glass, the radon being gathered and placed in a long capillary tube of either material, this long tube being thereafter subdivided into seed lengths. The glass seeds are sealed off with a flame; the gold seeds are pinched with an ordinary pair of pliers, the cutting edges of

FIG. 1.



The diagram (A) shows a cross-section of a platinum radon seed embedded in tissue, the cross-hatching representing the "zone of potential tissue change" about the seed; this zone is represented by a circle with a radius of 7 mm.

The diagram (B) illustrates the implantation of two seeds; cross-firing increases the zone of potential tissue change, so that the "limiting isodose line" must now be represented by the dotted line at the periphery of the cross-hatched area. The seeds are implanted 2 cm. apart to avoid overlapping of the zones of potential tissue change.

At the bottom (C) are three seeds implanted 2 cm. distant from one another. The zone of potential tissue change about each seed is represented by a cross-hatched area, showing how the effect of the centre seed is now increased by 3 mm. on each side. In actual practice it has been found that the radiation extends somewhat beyond the limiting isodose line represented by the dotted line enclosing all three schematic representations of the seeds and their surrounding zones of potential tissue change.

which have been purposely dulled. Though this usually makes a gas-tight seal, if there are any imperfections in the gold tubing leakage is likely. The violent reactions which have been reported in some cases where the gold seed has been used were probably due to this cause. The gold seeds are estimated by their designer as being twice the size of the bare tubes, but by virtue of their wall thickness of 0·3 mm. filtering out all but 8·8 per cent. of the beta radiation. As they contain twice the amount of radon that is used in glass seeds they are capable of transmitting twice the amount of gamma radiation possible by the older method. The greatest drawback they possess—aside from the dangers of leakage already mentioned—is the "chisel-like" ends left on each seed by the method of separation with pliers. Not only are these sharp ends likely to induce unnecessary trauma as they are introduced, as there is no way in which they can be recovered, they must remain as an irritative foreign body in the tissues they were used to treat, a circumstance which makes it quite impossible to use them under many conditions.

The fact that the platinum radon seed consists of a perfectly tight glass tube encased in platinum 0·3 mm. or 0·4 mm. thick, does make it, as was recently stressed by Duffy, somewhat larger than the gold seed. This disadvantage is, however, so trifling as in itself to be negligible, and when it is offset by the absolute certainty that leakage will not occur; that no trauma can be induced by its perfectly rounded ends; and that it can be removed as soon as treatment is concluded, its pre-eminence is readily recognised. Should any occasion arise wherein it is deemed undesirable to remove the seeds, the thread attached to each one can be easily omitted, though in practice this is seldom necessary. Even without its thread the platinum-screened seed is superior to the gold because of insurance against leakage and absence of irritation from the rough ends.

Application of the Platinum Radon Seed to Malignancies of the Mouth and Throat.

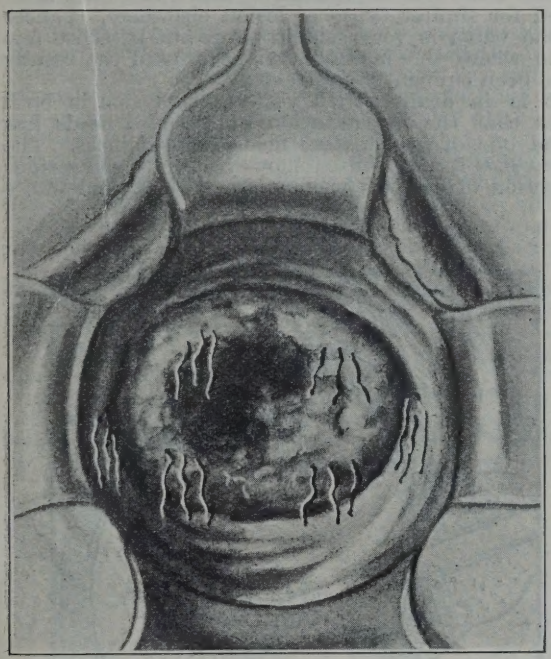
As most of the publications in England have referred only to the use of the platinum seed in treating intra-oral lesions it will be of greater interest to discuss at length some other applications of this form of therapy. Therefore it will be necessary only to touch briefly upon its use in the mouth and throat. In a publication made three years ago in the *Annals of Surgery* I called attention to the peculiar adaptability of the removable platinum seed to malignant lesions of the tongue. Especially is this true when the lesion is situated far back upon the dorsum of the tongue, where needles cannot be kept in place and no foreign body should be permitted to remain indefinitely in the tissues because of the extreme mobility of the parts. In any area of the mouth elimination of necrosis is essential because of the great vascularity of the tissues, so the assurance that no leakage of radon from the tube can occur is most desirable. Lesions at the root of the tongue and on the floor of the mouth, as well as those found in the tonsil or larynx, can be successfully implanted from the outside, thus doing away with any possibility of infection of the attached threads by the mouth secretions. This is, in practice, a purely hypothetical objection, but as it can reasonably be brought forward, it is desirable to provide against any such possibility.

In the œsophagus the dangers from tissue necrosis are perhaps greater than in any other area wherein radium therapy has been tried. Sloughing there means a fistula into lung or trachea, with rapidly fatal results. There is no doubt that a number of patients have met inevitable death sooner because of radium having been used by a method where necrosis could occur. By using the platinum-screened seed this danger is definitely eliminated, and even in cases where complete stricture had already taken place the lumen of the œsophagus has been restored to patency, and the patient so far relieved that he could return to a gainful employment, resuming his ordinary diet and habits.

Implantation as an Adjunct in Gynæcology and Urology.

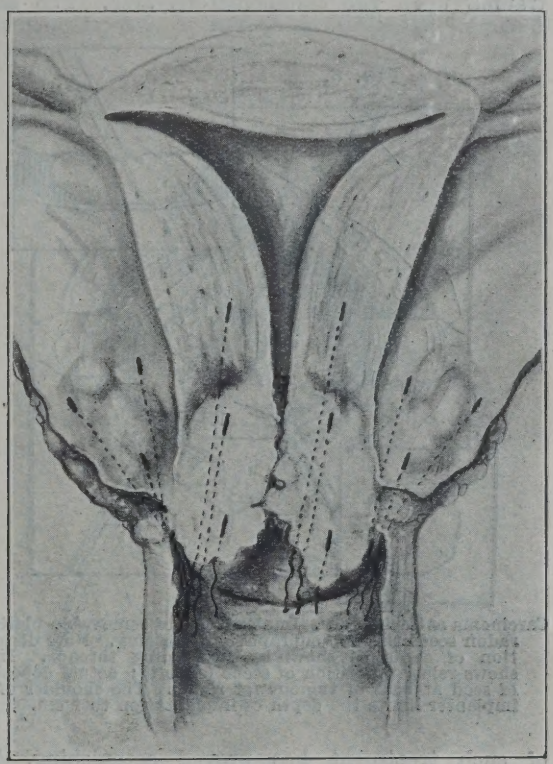
The treatment of early and moderately advanced cancer of the uterine cervix by radium has now been so standardised as to rank with surgery as an efficient method of treatment, being regarded as the method of choice in many clinics. In such a cavity as the uterus, however, the implantation method has, apparently, no place. Yet during the past three years this particular form of radium therapy has found an ever-increasing usefulness in cases showing involvement of broad ligaments and vagina, in which all methods—of surgery and radium alike—have heretofore proved impotent. When the cervical canal is completely blocked by malignant exuberations, or the cervix has become a sloughing mass, insertion of the usual uterine applicators becomes impossible. The woman who presented such a condition was once doomed to die unaided by anything more than palliation. Yet it is now possible for a skilful operator

FIG. 2.



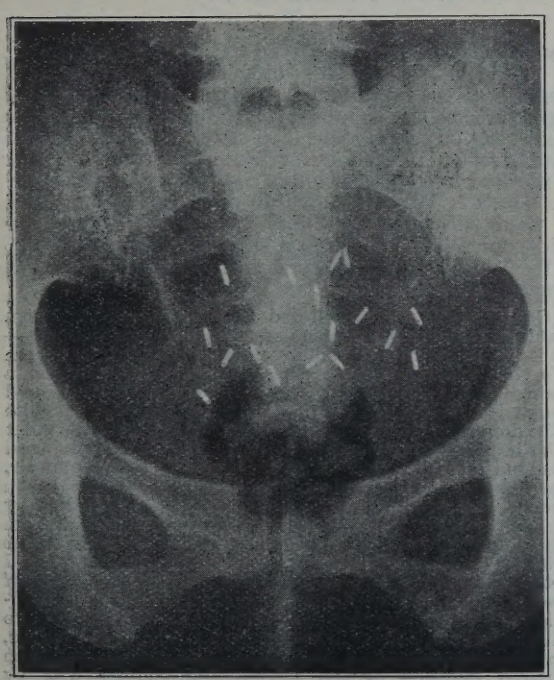
Advanced carcinoma of the uterine cervix. Removable platinum seeds have been implanted in the infiltrated tissues of the malignant cervix.

FIG. 3.



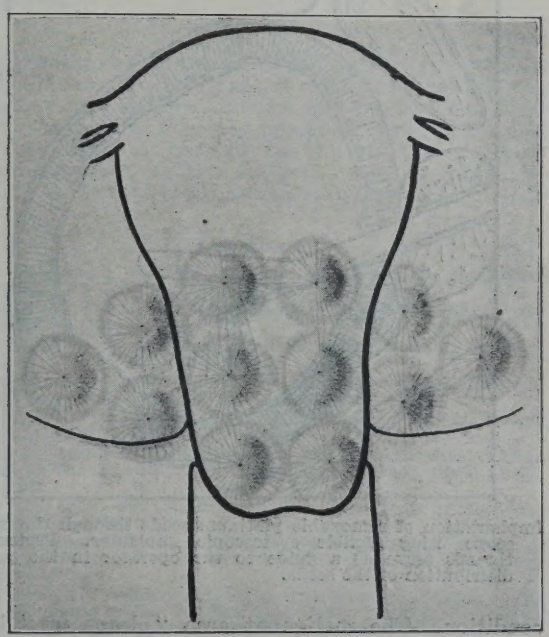
Advanced carcinoma of the uterine cervix. Cross-section (semi-schematic) showing the position of the implanted seeds in relation to the seed-threads.

FIG. 4.



Advanced carcinoma of the uterine cervix. Radiogram showing platinum seeds in position, immediately after implantation.

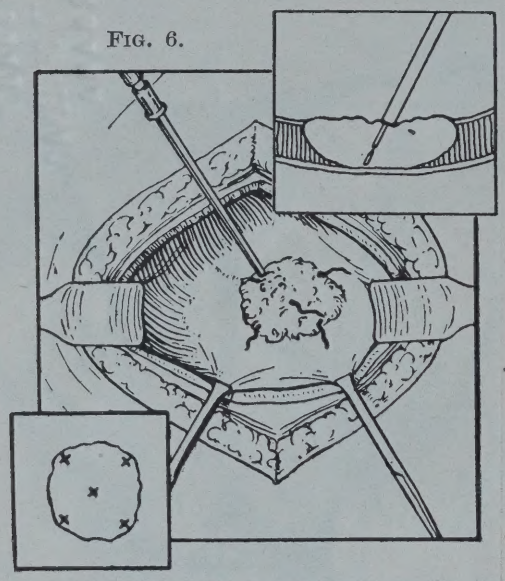
FIG. 5.



Advanced carcinoma of the uterine cervix. Schematic view showing zones of tissue irradiated by each seed.

to implant even the highly friable tissues infiltrated by advanced carcinoma, and to remove the seeds after a suitable exposure, without inflicting any further trauma upon the carcinomatous area. The effect

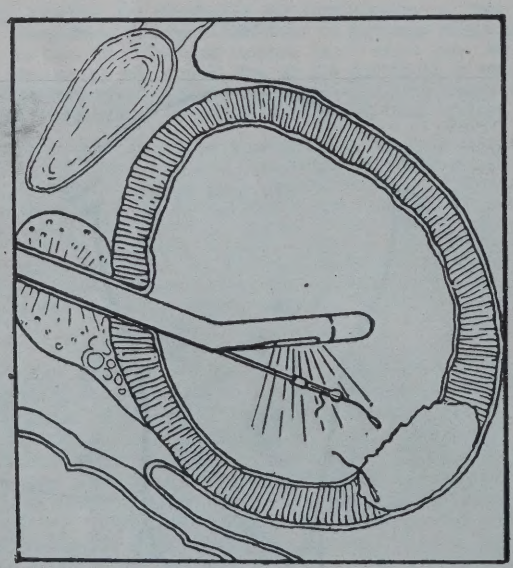
FIG. 6.



Carcinoma of the bladder. Implantation of removable platinum radon seeds through suprapubic cystotomy. Note distribution of seeds as shown by protruding threads. Insert shows relative position of seeds (at left); actual deposition of seed at base of tumour (at right). The shoulder of the implanter limits the depth of implantation to 1 cm.

of such treatment has proved astonishing. The intolerable pain rapidly subsides, foul-smelling discharge is lessened or ceases altogether, elimination of the toxic focus polluting the blood stream permits a marked improvement in the patient's general

FIG. 7.



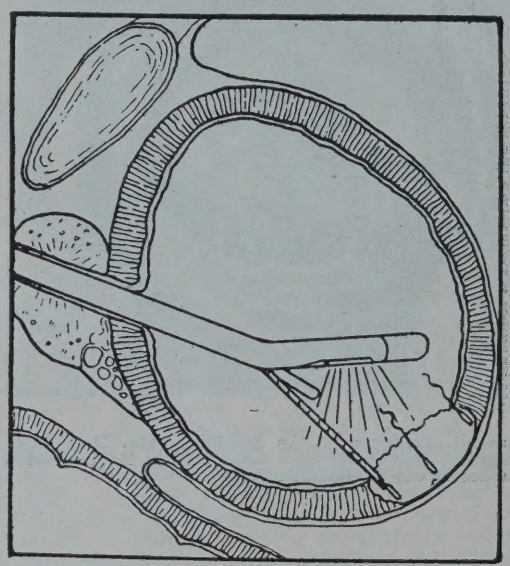
Implantation of removable platinum seeds through the cystoscope using flexible cystoscopic implanter. Protruding threads serve as a guide to the operator in the proper distribution of the seeds.

condition. The malignant area "cleans up" in a short time to such an extent that it will be possible to make use of the regular means of applying radium, as is done in the cases seen when only moderately advanced. So much benefit has accrued to this hitherto hopeless class of patients that even if we regard it merely as a form of palliation, the results amply justify the employment of the method.

In lesions lower down in the general tract, carcinoma of the vagina and vulva, implantation may be employed by the same general technique which has been indicated for similar types of lesion elsewhere. Cancer of the vulva is very seldom seen, but in those few cases where the method has been used the results have been eminently satisfactory.

It is in dealing with vesical neoplasms in both sexes that the implantation of screened seeds has found one of its greatest fields of usefulness. The bare tubes formerly used showed, despite the serious objection of necrosis production, that radium was a

FIG. 8.



Illustrating method of removing seeds through the cystoscope after adequate dosage has been delivered. This may be done with the ordinary cystoscopic forceps.

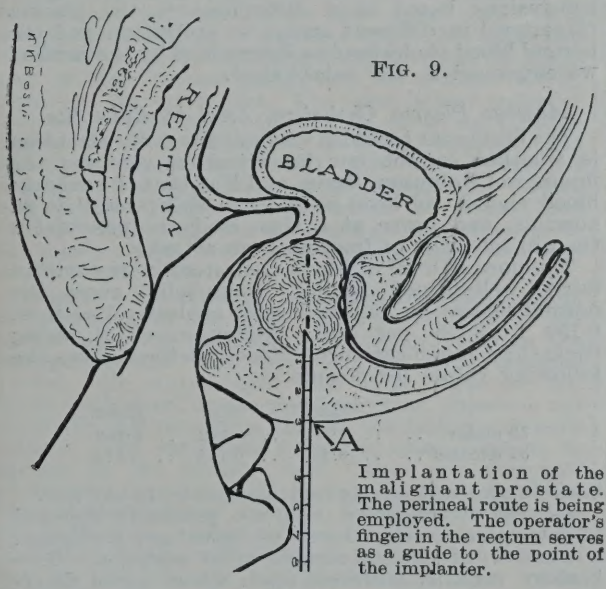
very effective agent in combating malignancy in the bladder. When the dangers of necrosis and sloughing were eliminated by the introduction of proper screens, the popularity of radium as a substitute for surgery or fulguration rapidly increased. In the recently issued text-book of Eisendrath and Rolnick the method of implantation is dwelt upon at consider able length. When removable platinum radon seeds are used the operation may be carried out either cystoscopically or through a suprapubic incision, but its usefulness in connexion with cystoscopic work especially commends it.

"One employs a seed filtered by 0·3 mm. of platinum, capable of delivering a dosage of 333-1/3 millicurie hours—that is, 2·5 millicuries of radium emanation destroyed in ten day's time. These seeds are placed in the neoplasm at a distance of 2 cm. apart. The Muir implanter is passed through the channel of an operating cystoscope. The site for the deposit of the first seed having been selected, the point of the implanter is thrust into the neoplasm and the seed placed in the loading slot. This seed, pushed by the plunger, is carried into the tissues to a predetermined depth. When it reaches this depth, its progress is automatically halted by the shoulder of the instrument which prevents the point from advancing beyond a certain distance. When the instrument is withdrawn, the seed remains in place, the thread attached to it being plainly visible protruding from the point of entrance. The first seed deposited thus serves as a landmark, from which the proper location of all subsequently to be implanted can be readily ascertained. The total number, of course, depends upon the size of the growth and the estimated invasion of the surrounding bladder wall by possible malignancy. . . . When the period of exposure to radiation has expired—this is ordinarily nine or ten days—the seeds are withdrawn through the cystoscope, using either an ordinary forceps or an instrument specially designed to

meet this need. The threads attached to the seeds must be cut off to a length not exceeding one centimetre before being placed in the loading slot, for if too long they may become entangled in the cystoscope as that instrument is withdrawn, and the seeds thus displaced or even dislodged entirely. With the exercise of a little care and deliberation, however, such accidents can be readily avoided."

In treating malignancy of the prostate it is customary to permit the seeds to remain permanently in the tissues, which causes no foreign body reaction nor irritation when the smoothly rounded platinum seeds are used. The implantation is generally done under novocaine infiltration; occasionally, when indicated, the sacral method is used successfully. Implantation is done preferably through the perineum, but where a suprapubic opening already exists it may be utilised for open insertion. A few operators make a suprapubic exposure especially to facilitate the implantation. The operator keeps his left index-finger in the rectum to guide the needle point of the implanter; when he feels the resistance of the tissues to the advance of the needle he will realise that the point has penetrated to depth sufficient to permit the seed to be deposited. The deepest seed must be deposited first, otherwise implantation may begin on either side. Four seeds are customarily employed, being deposited at the apices of the prostatic lobes in such a way as to bear the relation one to another such as is borne by the

FIG. 9.



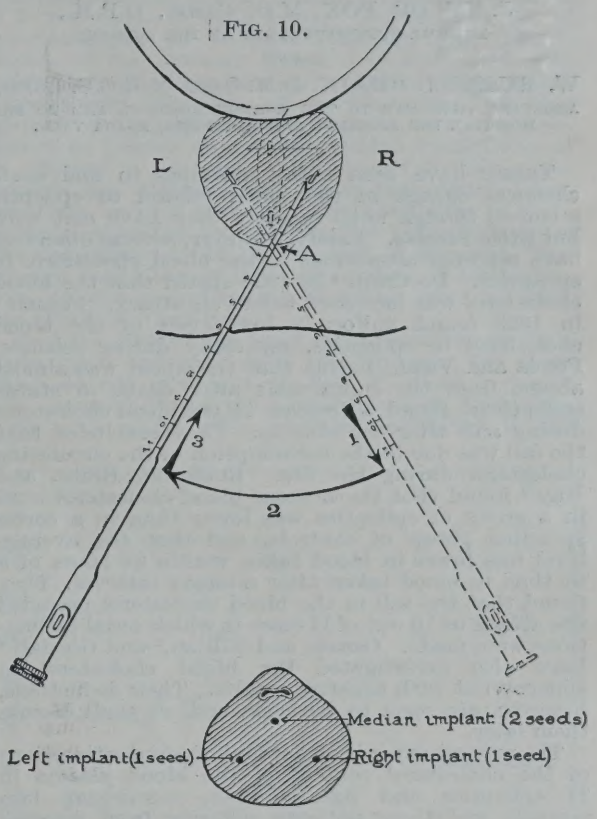
Implantation of the malignant prostate. The perineal route is being employed. The operator's finger in the rectum serves as a guide to the point of the implanter.

apices of a right-angle pyramid. But one portal of entry is necessary. The angle of the handle of the implanter can be altered without entirely withdrawing the instrument. The point can be withdrawn and the angle changed so that each seed will be deposited not less than 2 cm. from the others. The arrangement of the seeds can be clearly seen in the accompanying diagram (Fig. 10).

Suprapubic insertion does not differ especially from the transperineal technique, though the work is naturally much simplified by the free exposure of the site of malignancy. The seeds generally used in either case contain 2·5 millicuries of radon, which when left permanently in situ provides 333-1/3 millicurie hours of gamma radiation. This method of treating malignancy of the prostate will be found vastly superior to needles which have proved so traumatising that they have been largely abandoned in American clinics where much prostatic work is carried on. Lowsley and Kirwin in their text-book call attention to the possibility of permitting these prostatic patients to leave the hospital much sooner than under any other conditions of treatment. "This possibility of escaping the prolonged hospital stay will often induce him to undertake the radium treatment when other forms of therapy would be refused."

The simplicity and accuracy which are among the most salient features of this technique have greatly extended the field of usefulness within the bounds of

FIG. 10.



Implantation of the malignant prostate. The method of altering the angle of the implanter, so as to place the seeds at the different angles desired, is here shown. Insert gives schematic representation of the prostate after implantation is completed.

which radium has in the past been so closely restricted. It should serve to bring about rapid fulfilment of the prophesy made a few months ago by Mr. Hayward Pinch that, "in the very near future radium would form as much a part of the up-to-date surgeon's armamentarium as the scalpel," and it might be added—will prove itself as generally useful.

Literature.

Cade, Stanford: Radium Therapy of Cancer of the Buccal Cavity, THE LANCET, 1929, i., 8.

Duffy, J. J.: The Use of Gold-Filtered Radon Seeds, Radiology, February, 1929, p. 93.

Eisendrath, D. N., and Rolnick, H. G.: Text-book of Urology, London and Philadelphia, 1928.

Fitzwilliams, D. C. L.: Radium in the Treatment of Cancer of the Breast and Tongue, THE LANCET, 1928, i., 554.

Gask, G. E.: Radium in the Treatment of Malignant Disease, Ibid., 1928, i., 843.

Gosse, P., and Chester-Williams, F. E.: The Screened Radon Seed in the Treatment of Malignant Growths, Ibid., 1928, ii., 323.

Lowsley, O. S., and Kirwin, T. J.: Text-book of Urology, Philadelphia, 1926.

Medical Research Council: Medical Uses of Radium, Survey of Reports from Research Centres for 1927, H.M. Stationery Office, 1928.

Muir, Joseph: Technic of the Use of Removable Radon Seeds in Carcinoma of the Tongue, Ann. Surg., 1926, lxxxiii., 593; Irradiation of Vesical Neoplasms by Removable Platinum Radon Seeds; description of New Instruments Designed to Facilitate their Employment, Jour. Urol., 1927, xvii., 53; the Therapeutic Uses of Radium Emanation, Med. Jour. and Rec., Jan. 16th, 1929.

Pinch, A. E. H.: See THE LANCET, 1928, i., 602.

THE CHOLESTEROL OF THE BLOOD PLASMA IN EPILEPSY.

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THERE have been many attempts to find some chemical change in the blood related to epileptic seizures, though until recently they have met with but little success. Lately, however, several observers have reported alterations in the blood cholesterol in epileptics. De Crinis [3] in 1920 stated that the blood cholesterol was increased before an attack. Pezzali [6] in 1923 found uniformly low levels of the blood cholesterol in epileptics, especially during seizures. Popéa and Vicol,[7] noting that the lipoid was almost absent from the suprarenals after death in status epilepticus, found a decrease in the blood cholesterol during and after the attacks. They concluded that the fall was due to the consumption of the circulating cholesterol during the fits. Robinson, Brain, and Kay [8] found that the average blood cholesterol level in a group of epileptics was lower than in a corresponding group of controls, and that the average level was lower in blood taken within 24 hours of a fit than in blood taken after a longer interval. They found that the fall in the blood cholesterol preceded the attack in 10 out of 11 cases in which serial estimations were made. Osnato and Killian,[5] and Goodall [4] have also investigated the blood cholesterol in epilepsy but with negative results. Their deductions, however, are open to criticism and we shall discuss them later.

The present paper is an account of serial estimations of the cholesterol content of the blood plasma in 21 epileptics and five controls, comprising two normals and three patients suffering from diseases of the nervous system other than epilepsy.

Method.

The method employed was that of Bloor,[1] the only modification being that 1 c.cm. of plasma was used in 25 c.cm. of the alcohol and ether mixture. It has been found that this method will only give satisfactory results if the instructions in the original paper are strictly adhered to. In this series of estimations there has been little difficulty in matching the green colour produced, but it has been found that the following conditions are important. All glassware used in the final extraction with chloroform must be absolutely freed from moisture, preferably by drying in hot air; if this is not done a yellow tinge in the final green colour makes it difficult to match with the standard, and also gives too low a result. The acid used to develop the colour must be fresh and the amount (0·1 c.cm.) very accurately measured; the slightest excess gives a blue tinge in the green. The colour develops best within Bloor's limits of temperature—viz., 20–22°C.—and readings should be made 12 to 15 minutes later. It has been noticed that the colour does not develop fully in less than ten minutes and may begin to fade if left much over 15 minutes; consequently not more than six or seven estimations can be made with the same standard. With every precaution we have found that the method gives a difference of about 3 per cent. in different estimations of the same samples of plasma—e.g., in three separate such estimations on the same sample the results were as follows:—

1. 0·203
2. 0·202
3. 0·208

} Per cent. of cholesterol in 100 c.cm. plasma.

Therefore in the following series variations of less than 10 mg. between successive estimations may be due to experimental error. The estimations have been done on oxalated blood plasma, obtained by venepuncture. Estimations on whole blood have not been included, as experience showed that after extracting this with the boiling alcohol and ether mixture the extract had, in some cases, a brownish tinge which interfered with the final colour. This did not occur with blood plasma.

It will be appreciated that the necessity for repeated venepunctures made it difficult to secure a large series of estimations, especially in children. Moreover, venepuncture was usually impossible when status epilepticus was actually in progress. Most of the observations have been made during the night with the patients at rest in bed, several hours after the last meal. This has been done partly because the fit incidence is higher at night and partly to eliminate the effect of meals and of possible changes due to muscular exercise, although, as a matter of fact, in curves obtained during the day meals alone did not affect the level (see Series 12 and 13 in Appendix I.). The epileptics investigated were all patients living an active outdoor life at the Colony, Lingfield, and were clinically healthy except for fits; patients with conditions known to be associated with a low blood cholesterol—e.g., anæmia or infective conditions—were not included, and all the cases, with two exceptions (Nos. 12 and 29), apparently belong to the "idiopathic" group.

We regret that owing to one of us leaving England, it was not possible for us to include as many determinations of the plasma cholesterol in controls as we should have liked. We felt that it was better to publish our investigations as they stood, rather than that the determinations in normals and epileptics should be made by different persons. The lack of controls, of course, does not affect the validity of conclusions based upon differences in the plasma cholesterol in different groups of epileptics, and the normal blood cholesterol as determined by the method we employed is well established.

Average Plasma Cholesterol Level in Epileptics.

The first point to which we shall direct our attention is whether or not our investigation confirms the findings of Robinson, Brain, and Kay that the average blood cholesterol level is lower in epileptics than in normals, and lower at a time near the convulsion than in intervals of freedom from attacks.

The normal level of blood cholesterol varies within fairly well-defined limits. Campbell [2] gives the normal figures for free and ester cholesterol as from 0·150 to 0·230 per cent. Robinson et al, using Sackett's [9] modification of Bloor's method, gives the following values for plasma:—

	Max.	Min.	Mean.
39 males	0·212	0·142	0·163
32 females	0·217	0·133	0·172

Sackett obtained results varying from 0·115 to 0·280.

As our investigation was not primarily directed to determine average levels we have not performed a number of determinations upon normals. Two healthy persons, however, upon whom serial determinations were made yielded means of 0·241 and 0·207 per cent.; and we have also employed as controls three patients suffering from diseases of the nervous system other than epilepsy.

The following table embodies our results so far as they throw light upon the average plasma cholesterol level in epilepsy:—

Present investigation.					Robinson, Brain, and Kay.
Class of patient.	Patients.	Series.	Readings.	Average (plasma cholesterol).	
Controls	5	5	32	187	167
Epileptics: Blood removed more than 24 hours before or after a fit	7	10	59	142	155
Epileptics: Blood removed within 24 hours of a fit, excluding cases of status..	15	17	111	137	135
Epileptics: In status or serial epilepsy	4	5	26	100	—

These figures appear to us to justify two conclusions:—

1. The average blood cholesterol in this group of 19 epileptics is below normal.

2. Status epilepticus and serial epilepsy are associated with especially marked depression of the blood cholesterol. The extremely low figure of 0·036 per cent. was obtained in one of our patients at the end of a severe attack of status. The numbers are insufficient to justify any conclusion being drawn as to the relative level of the blood cholesterol at times near and remote from the attack.

Osnato and Killian [5] have criticised the findings of Robinson, Brain, and Kay and drawn contrary conclusions on grounds which appear to us entirely inadequate. They report a single determination of the blood cholesterol in 22 epileptics, in four of whom the blood was obtained within 24 hours of a fit. Such small numbers in our opinion justify no conclusion whatever as to the behaviour of the blood cholesterol in relation to the fits. Osnato and Killian criticise Robinson, Brain, and Kay on the ground that the blood cholesterol varies in normals during the day more than the difference between normals and epileptics. Such criticism is misdirected, and appears to be based upon a misunderstanding of the nature of averages. In the series of Robinson, Brain, and Kay there are 124 epileptics and 71 controls. Any normal variation ought on Osnato's hypothesis to be common to both groups and cancel out. It is unthinkable that, as he seems to imply, 124 epileptics should all have been examined by chance at the lower part of their normal range, and the controls all by chance at the upper part. The same fallacy underlies Osnato's stress upon anæmia or fever as possible causes of the differences between normals and epileptics, since the controls were taken from the same hospital population as the epileptics. Osnato and Killian, moreover, performed no serial blood cholesterol determinations in epileptics, and misquote the number performed by Robinson, Brain, and Kay as 2 instead of 11.

Goodall [4] has recently published the results of an investigation of the blood cholesterol level in six epileptics, three determinations being made in the interparoxysmal and three in the preparoxysmal period. He states that "the mean value for the blood cholesterol in the preparoxysmal phases is not markedly different from that in the interparoxysmal phases. The variations from the mean tend to be greater in the former," and "the preparoxysmal cholesterol usually tends to be slightly lower than the interparoxysmal value." Goodall's findings, as far as they go, appear to support the conclusions of Robinson, Brain, and Kay, but we feel that it would not be justifiable to lay much stress upon them. Since the blood cholesterol in epilepsy may vary greatly from hour to hour especially in the proximity of a fit, it is doubtful if much information can be gained from so small a number of determinations. Either the serial method or the averaging of determinations in large groups would seem to be essential.

Variability of Cholesterol Level in Epileptics.

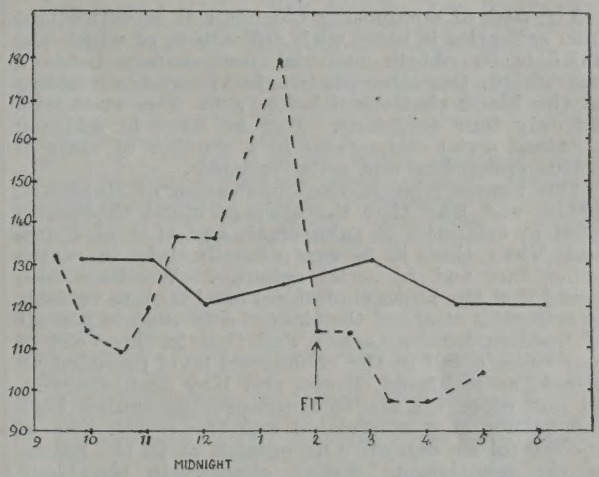
Our special object in this investigation was to study the behaviour of the plasma cholesterol level in epileptics by means of serial determinations, to observe whether abnormal variations in the level occurred, and, if so, whether these were in any way related to the occurrence of fits.

It is first necessary to form an opinion as to the normal limits of variation of the blood cholesterol. The simplest mode of expressing the variability as determined over a given series of determinations is to take the average level of the series and the range—i.e., the difference between the highest and lowest value in the series—and to express the range as a percentage of the average. For example, if the average of seven serial determinations were 150 mg. per 100 c.cm., the highest value obtained being 200 and the lowest 125, then the range is 75, and

$$\frac{\text{range}}{\text{average}} = \frac{75}{150} = 50 \text{ per cent.}$$

There are comparatively few data upon which to base an opinion as to the normal variability of the blood cholesterol. We have made two series of determinations on healthy adults, yielding variabilities of 5 per cent. in each case; and three series of determinations on patients suffering from organic disease of the nervous system not associated with convulsions—namely, two early cases of disseminated sclerosis and one case of parkinsonism following epidemic encephalitis. These patients, who, of course, cannot be treated as normals, yielded variabilities of 13, 22, and 5 per cent. Osnato and Killian quote Somach and Halpern who made four serial determinations on four normals. The variability in these normals estimated by us from the published charts was approximately 15, 12, 27, and 16 per cent. The average variability of these nine series of determinations on non-epileptics, six of whom were normals, was about 13·3 per cent.

We have divided the serial determinations we have made upon epileptics into two groups: (1) those which do not include a fit, and (2) those in which a fit occurred during the period in which determinations were made. The average variability in the



Charts representing two series of determinations of the plasma cholesterol of the same patient made on dates separated by two months. The continuous line represents the series in which no fit occurred, the interrupted line a series including a fit, which began as the blood was withdrawn at 2 A.M. The marked fall in the plasma cholesterol between 1·15 and 2 A.M. thus preceded the attack. (Series Nos. 8 and 21.)

former group was 20 per cent., and in the latter 31 per cent. Thus the occurrence of a fit during the period of observation is found to be associated with a variability of the blood cholesterol level which is 50 per cent. greater than when no fit occurs, in which case the variability differs little from the normal.

Consideration of Some Individual Series.

Certain points of interest emerge from a consideration of individual series of determinations.

(1) *Cholesterol Instability Without a Fit.*—Three series of determinations, Nos. 15, 16, and 17, showed abnormal variability—namely, 57, 42, and 35 per cent. respectively, without a fit occurring. Series 15 and 16 were made on the same patient, and in each case because it was thought likely that a fit would occur as the patient exhibited the usual prodromal manifestations. This expectation, however, was not fulfilled, yet the cholesterol instability often associated with a fit occurred.

(2) *Fall in Blood Cholesterol Level Preceding a Fit.*—Robinson, Brain, and Kay made 11 series of determinations preceding an attack and found that in ten of these a fall in the blood and plasma cholesterol

preceded the attack. We have records of 12 series which include attacks, but only four of these are comparable with Robinson, Brain, and Kay's series in that a number of determinations were made before an attack. In three of these four the attack was, as in Robinson's series, preceded by a fall in the plasma cholesterol. The accompanying chart is of interest as illustrating two series of determinations made in the same patient, one including and one (No. 8) not including an attack. It will be observed that the curve which includes an attack exhibits the pre-paroxysmal fall described by Robinson, Brain, and Kay, previous to which the cholesterol level is high as De Crinis observed. The marked variations occurring in the space of a few hours show how misleading a single determination of the blood cholesterol may be. Determinations separated by only three-quarters of an hour—namely, those at 1.15 A.M. and 2 A.M. differ by 64 mg. per cent. An isolated determination would lead to diametrically opposite conclusions concerning the blood cholesterol level according to whether it was made at the former or the latter time, both of which are within an hour of an attack. It is in the light of such observations that we feel bound to criticise the adequacy of the data upon which Osnato and Killian and Goodall base their conclusions.

Conclusions.

The task of conducting biochemical investigations into epileptics is beset with difficulties, of which the chief is to obtain material immediately before a convulsion. Our attempts to achieve serial estimations of the blood cholesterol before a fit were successful on only four occasions. But we have in addition obtained serial estimations in a number of cases of status epilepticus and serial epilepsy.

Our figures confirm the observation of Robinson, Brain, and Kay that the average blood cholesterol level in epileptics is subnormal, and that of Popéa and Vicol that it is exceptionally low in status epilepticus and in serial epilepsy. We have also found that the blood cholesterol level is more variable in epileptics at about the time of a fit than in periods of freedom from attacks; and that in three out of four cases a fall in the cholesterol level preceded an attack, as Robinson, Brain, and Kay first observed. In our present state of ignorance concerning both the nature of a convulsion and the metabolism of cholesterol we can offer no opinion as to the nature of the association between changes in the blood cholesterol level and the occurrence of fits.

APPENDIX I.

Serial Determinations of the Plasma Cholesterol in Non-epileptics.

1. Normal, male, aged 44. Night of Jan. 28th–29th.

10 P.M.	0·238	2.30 A.M.	0·242
11.30 P.M.	0·238	4 A.M.	0·247
1 A.M.	0·235	5.35 A.M.	0·247

2. Normal, female, aged 34. Night of Jan. 28th–29th.

10.30 P.M.	0·208	2.45 A.M.	0·202
11.45 P.M.	0·202	4.10 A.M.	0·213
1.15 A.M.	0·208	6 A.M.	0·210

3. Early disseminated sclerosis. Male, aged 22. Night of Dec. 21st–22nd.

9.5 P.M.	0·178	3 A.M.	0·166
10.35 P.M.	0·178	4.30 A.M.	0·172
12.5 A.M.	0·156	6 A.M.	0·170
1.35 A.M.	0·166		

4. Early disseminated sclerosis. Male, aged 22½. Night Dec. 21st–22nd.

9 P.M.	0·179	3 A.M.	0·185
10.30 P.M.	0·185	4.30 A.M.	0·208
12	0·179	6 A.M.	0·208
1.30 A.M.	0·166		

5. Post-encephalitic parkinsonism. Male, aged 21. Night of Dec. 21st–22nd.

9 P.M.	0·125	3 A.M., specimen broken.	
10.30 P.M.	0·129	4.30 A.M.	0·128
12	0·125	6 A.M.	0·130
1.30 A.M.	0·124		

Serial Determinations of the Plasma Cholesterol in Epileptics.

Group 1. Series not including an attack.—Nos. 6 and 7 (G. H.). Two serial estimations, first during the morning of July 9th, and next during the night of Nov. 5th–6th. Last fit in No. 6 on July 6th, next on July 11th. Last fit in No. 7 on Oct. 30th, next on Nov. 6th. Drugs (routine): bromide grs. 10 in morning and grs. 20 with grs. 2 of luminal at night.

No. 6. July 9th.		No. 7. Nov. 5th–6th.	
11.30 A.M.	0·119	10 P.M.	0·125
12.30 P.M.	0·119	11 P.M.	0·131
2.30 P.M.	0·119	12	0·119
		1 A.M.	0·125
		4 A.M.	0·122
		5.30 A.M.	0·119

No. 8 (A. C.). During night of Sept. 14th–15th. Last fit Sept. 12th, next on Sept. 17th. Drugs (routine): bromide grs. 20 at night. (See also No. 21.)

10 P.M.	0·131	3 A.M.	0·131
11 P.M.	0·131	4.30 A.M.	0·119
12	0·119	6 A.M.	0·119
1.30 A.M.	0·125		

No. 9 (A. E. B.). Night of Nov. 5th–6th. Last fit Oct. 23rd, next on Nov. 14th. Drugs: bromide grs. 20 and luminal grs. 2, at night.

10 P.M.	0·179	2.30 A.M.	0·183
11 P.M.	0·179	4 A.M., specimen lost.	
12	0·186	5.30 A.M.	0·179
1 A.M.	0·179	(See also Nos. 14, 15, 16.)	

No. 10 (H. B.). Night of July 21st–22nd. No fit for a year. Four grains of luminal were given during the night as an experiment, but it had no apparent effect on the cholesterol level.

10 P.M.	0·108	3 A.M.	0·108
12	0·104	4 A.M.	0·101
2 A.M.	0·108	6 A.M.	0·108

No. 11 (A. G. M.). Night of Nov. 5th–6th. Last fit early morning of Nov. 5th, next on Nov. 24th. No. 32 is from the same patient during a night when a fit occurred. Drugs (routine): nil.

10 P.M.	0·125	2.30 A.M.	0·133
11 P.M.	0·125	4 A.M.	0·109
12	0·125	5.30 A.M.	0·125
1 A.M.	0·130		

No. 12 (S. C.). During day of Nov. 20th. Last fit three days previously, next fit five days later. Drugs: luminal grs. 2 at night.

11.15 A.M.	0·102	3.5 P.M.	0·104
12.5 P.M.	0·099	4.35 P.M.	0·106
1.35 P.M., specimen lost.		6.5 P.M.	0·108

No. 13 (P. E. W.). During day of Nov. 20th, 1928. Major fit a few hours previously; next fit seven days later.

11.10 A.M.	0·093	4.30 P.M.	0·089
1.30 P.M.	0·075	6 P.M.	0·090
3 P.M.	0·088		

No. 14 (A. E. B.). (See also No. 9.) During morning of July 21st. He got up saying he felt he was going to have a fit, but was determined to stop it as he wished to play cricket that afternoon. No fit occurred.

8.30 A.M.	0·204	10.20 A.M.	0·192
9.15 A.M.	0·192	12 noon	0·179

No. 15 (A. E. B.). During night of July 21st–22nd. The sister in charge of the home was confident that a fit would occur during this night, as the patient had been irritable and a fit was due. Last fit June 29th; next August 1st. No fit occurred in July, the average number for other months being three.

8.45 P.M.	0·217	12.15 A.M.	0·156
10 P.M.	0·156	1.45 A.M.	0·168
10.45 P.M.	0·142	3 A.M.	0·165
11.15 P.M.	0·125	6.30 A.M.	0·174

No. 16 (A. E. B.). During night of Sept. 14th–15th. A fit was similarly predicted but did not occur. Last fit August 23rd; next Sept. 20th.

10.5 P.M.	0·147	3.5 A.M.	0·122
11.5 P.M.	0·099	4.35 A.M.	0·147
12.5 A.M.	0·109	6 A.M.	0·139
1.45 A.M.	0·109		

No. 17 (E. S.). During night of July 21st–22nd. This was a patient who was liable to multiple automatic attacks at night, but was then in a period of freedom from attacks. No. 25 is from the same patient when attacks occurred. Drugs: luminal grs. 4 at night.

10.15 P.M.	0·161	3.45 A.M.	0·128
11.15 P.M.	0·174	4.45 A.M.	0·156
12.15 A.M.	0·184	6 A.M.	0·130
1.45 A.M.	0·174		

No. 18 (H. D.). During night of Sept. 14th–15th. Last fit four years previously. Drugs: luminal grs. 2 at night.

10 P.M.	0·128	3 A.M.	0·113
11 P.M.	0·125	4.30 A.M.	0·147
12	0·119	6 A.M.	0·140
1.30 A.M.	0·147		

No. 19 (C. J. H.). During night of Sept. 14th–15th. The attendant at the home felt sure this man would have a fit during the night. The fit occurred at 11 A.M., five hours after the last cholesterol determination. This patient is very rarely convulsed during the day.

10 P.M.	0·128	3 A.M.	0·113
11 P.M.	0·125	4.30 A.M.	0·147
12	0·119	6 A.M.	0·140
1.30 A.M.	0·147		

No. 20. (G. G.). During day of Nov. 20th. Last fit five hours previously. A major fit is usually followed by another in a few hours, but this did not occur on this occasion. Drugs: luminal gr. 1 in morning; bromide gr. 10 at night.

11.5 A.M.	0·119	3.15 P.M.	0·147
12 noon	0·138	4.40 P.M.	0·132
1.40 P.M.	0·114	6.15 P.M.	0·114

Group 2. Series in which fits occurred during observation.—It has not been found easy to collect specimens showing estimations just before fits as their occurrence is so irregular, and so few patients have any but a brief warning. The results which have been obtained are as follows:—

No. 21 (A. C.). During night of July 14th–15th. A major fit occurred at 2 A.M. Fits occurred on nine previous nights and on the following night. No. 8 is a curve from the same patient during a night without a fit.

9.35 P.M.	0·132	1·15 A.M.	0·178
10.5 P.M.	0·114	2 A.M.	0·114*
10.35 P.M.	0·109	2.30 A.M.	0·114
11.5 P.M.	0·119	3.15 A.M.	0·096
11.35 P.M.	0·136	4 A.M.	0·096
12.5 A.M.	0·136	5 A.M.	0·104

*Major fit commenced as this specimen was being collected.

No. 22 (W. H. T.). Night of July 18th–19th, with two major fits at 5.45 A.M. and 7.45 A.M. Previous fit on June 17th. Several fits followed during the two days after the cholesterol determination.

9.30 P.M.	0·132	3.30 A.M.	0·141
10.15 P.M.	0·132	5 A.M.	0·137
11.45 P.M.	0·119	6 A.M.	0·120
1.30 A.M.	0·125	6.30 A.M.	0·120
2.30 A.M.	0·132	8 A.M.	0·120

No. 23 (W. W.). During day, Nov. 21st. Major fit at 10.50 A.M.

10.15 A.M.	0·100	11.15 A.M.	0·094
10.45 A.M.	0·087	11.45 A.M.	0·110

No. 24 (M. C.). During day, Dec. 14th. A few estimations during a long period of serial epilepsy. Fits at 9.35, 11.20, and 11.55 A.M., and 12.27 P.M.

9.30 A.M.	0·109	11.40 A.M.	0·109
10.10 A.M.	0.116	12.30 P.M.	0·110
10.40 A.M.	0·109	1 P.M.	0·111
11.10 A.M.	0·100		

No. 25 (E. S.). During night of Jan. 25th–26th. Attack of automatism at 6.10 A.M. (See also No. 17.)

10.45 P.M.	0·208	4.5 A.M.	0·181
11.35 P.M.	0·214	5.45 A.M.	0·181
1 A.M.	0·211	6.25 A.M.	0·178
2.35 A.M.	0·195		

No. 26 (H. R. M.). During day, July 22nd. These estimations made during a severe attack of status epilepticus. The attack started at 6.5 A.M. and stopped at 7.30 A.M. At 7.10 the patient stopped breathing and was in a very serious condition. Drugs (routine): bromide, grs. 30, at night; luminal, grs. 2, in morning.

7.15 A.M.	0·061	8 A.M.	0·083
7.40 A.M.	0·036	8.45 A.M.	0·093

No. 27 (H. R. M., same patient as 26). These estimations were made in another attack of status, on Sept. 11th, when his condition was not quite so serious. The status began at 5.15 A.M. Thirty major fits occurred between 5.15 and 5.36 A.M. without return of consciousness between. Then fits occurred at 5.45, 5.55, 6.10, and 6.20 A.M., when the attack ended.

5.50 A.M.	0·131	7.20 A.M.	0·104
6.20 A.M.	0·109	8.30 A.M.	0·104
6.50 A.M.	0·108	10.30 A.M.	0·119

No. 28 (L. N. D. L.). During a long attack of serial epilepsy on August 5th: fits occurred at 10.25 and 10.44 A.M. During the previous 48 hours 213 fits had occurred.

10 A.M.	0·104	11.30 A.M.	0·100
10.30 A.M.	0·094	12 noon	0·104
11 A.M.	0·098		

No. 29 (J. D.). Four estimations at the end of a status beginning at 12 noon and lasting 18 minutes. Seven major fits preceded the status, Dec. 7th.

12.35 P.M.	0·110	3 P.M.	0·092
2.30 P.M.	0·110	4 P.M.	0·096

No. 30 (V. T.). Estimations during repeated slight attacks of petit mal which began at 8 A.M. and continued until 11 A.M.

8.45 A.M.	0·125	10.20 A.M.	0·125
9.15 A.M.	0·156	10.45 A.M.	0·135
9.45 A.M.	0·127		

No. 31 (A. H. M.). Dec. 7th. Estimations during repeated attacks of petit mal, beginning at 8 A.M. and ending at 10 A.M., attacks occurring every three or four seconds.

8.50 A.M.	0·114	10.20 A.M.	0·104
9.20 A.M.	0·114	10.50 A.M.	0·131
9.50 A.M.	0·100		

No. 32 (A. G. M.). Night of July 21st–22nd. Fits occurred at 11.57 P.M. and 4.30 A.M. (See No. 11.)

10 P.M.	0·192	1.45 A.M.	0·208
10.30 P.M.	0·192	2.45 A.M.	0·208
11 P.M.	0·166	3.45 A.M.	0·208
11.30 P.M.	0·192	4.30 A.M.	0·240
12	0·166	5 A.M.	0·223
12.30 A.M.	0·178	6 A.M.	0·233
1 A.M.	0·156		

APPENDIX II.

Clinical Notes on Epileptic Patients Investigated.

Nos. 6 and 7 (G. H.). Male, aged 24. Four brothers and sisters died of convulsions a few days after birth, another stillborn. Physically ill-developed and undersized, but much stronger than formerly. Mentally dull. Stricture of posterior urethra (? congenital) treated surgically in 1927. First fit aged 8. About five attacks a month with unconsciousness and partial or complete convulsions. A few automatic attacks in addition.

No. 8 (A. C.). Male, aged 25. Father committed suicide. Mother alcoholic. Father's cousin epileptic. Mentally normal and physically robust. First fit aged 13, ascribed to concussion two years earlier. Large number of major fits, almost all at night, averaging ten a month. Often has fits every night for a week or more at a time. Occasional short attacks of automatism.

No. 9 (A. E. B.). Male, aged 26. Both parents died insane. Formerly of normal intelligence, but now deteriorating mentally. Physical condition good. First fit aged 14. Very large number of major attacks chiefly in small groups.

No. 10 (H. W. B.). Male, aged 25. Severe head moulding at birth. Some asymmetry of chest. Left-handed. Mentally normal. Physically frail. First fit aged 14. Frequent major fits persisted for six years. Recurred a year later in smaller numbers. Last fit recorded Sept., 1927.

No. 11 (A. G. M.). Male, aged 22. Some stigmata. Large and coarse features. Large square hands with thick fingers. Ears, lobules adherent. Slow slurring speech. Some tremor. Poor circulation. Mentally dull and deteriorating. First fit aged 12 (? due to sunstroke). Large number of majors, often occurring in series, lasting a few days and accompanied by some mental confusion. Considerable improvement last six months apparently due to pot. borotartrate.

No. 12 (G. C.). Male, aged 15. Mentally three years retarded and deteriorating. First fit aged 5, occurred within 24 hours of a fracture of the skull. Fits recurred at the age of 10. A year later trephined in right fronto-parietal region and bone, said to be pressing on the brain, removed. No improvement in fit incidence resulted. Now has about seven major attacks a month, the left side being more involved than the right.

No. 13 (P. E. W.). Male, aged 23. Mother hysterical. Physical condition and intelligence good. Mentally rather unstable. First fit aged 3, recurred aged 8. Major attacks have occurred regularly since, with rather increasing frequency, now averaging six a month.

Nos. 14, 15, and 16: see No. 9 above.

No. 17 (E.S.). Male, aged 35. Physical and mental condition good. First fit aged 23, supposed to be due to being blown up and buried a year previously. Major fits, ten in 1927 and two in 1928. Short automatic attacks, characterised by extreme fright and screaming and almost always arising in sleep have occurred for years. The number varies from one up to six a night. The periods of freedom from these attacks are now increasing, and during 1928 he was clear for eight consecutive months. The improvement may be due to luminal, grs. 4, nightly.

No. 18 (H. D.). Male, aged 25. Mother had fits and died of tumour of the brain. Brother died of convulsions while teething. Father intemperate. Mentally a little dull. Physically strong. First fit aged 13, ascribed to a fall.

Very frequent major fits, often in series and sometimes accompanied by grave mental confusion, until in 1924 luminal medication (grs. 2 daily) was started, since when fits have been completely absent.

No. 19 (C. H.). Male, aged 33. Physical condition good. Mentally deteriorating. First fit aged 25, supposed to be due to heatstroke in India. Major fits, all at night, occur at the rate of seven or eight a month.

No. 20 (G. G.). Male, aged 17. One sister insane. Undersized. Face and head asymmetrical. Ears prominent. High palate. Hyper-extensible joints. High grade feeble-minded. First fit aged 10. Mostly major type in groups of three or four.

No. 21 (A. C.). (See No. 8 above.)

No. 22 (W. H. T.). Male, aged 22. Mentally dull and deteriorating. Physically fairly strong. First fit aged 7. Major attacks often in groups of eight or ten spread over three or four days, averaging four or five a month in all.

No. 23 (W. S. W.). Male, aged 12. Physically and mentally normal in spite of frequent fits. First fit aged 11 months, ascribed to fall on the head two months previously. Major attacks occur in groups from one to eight about once a month.

No. 24. (M. C.) Female, aged 14. Physical condition good. Mentally a little subnormal. First fit aged 12 months. Second attack a few years later. During 1928 isolated major fits every two or three weeks, gradually becoming more frequent until the beginning of December, when they averaged 20 a day and are still (1/2/29) continuing at about the same rate.

No. 25 (E. S.). (See No. 17 above.)

Nos. 26 and 27 (H. R. M.). Male, aged 26. Formerly in the Navy. Mentally deteriorating. Physical condition fair. First fit aged 7, said to have followed a fall downstairs. Large and increasing numbers of major fits. Prolonged series of true status epilepticus every few weeks. A case of severe epilepsy.

No. 28 (L. N. D. L.). Male, aged 13. Physically hypotonic. Tremors, some stigmata. Intelligence nearly normal, but conduct very abnormal, especially when fit incidence is high. First fit aged 8. Large numbers of attacks, mostly major in type, occurring very irregularly.

No. 29 (J. D.). Male, aged 28. A sister died of convulsions at 18 months. Feeble-minded and deteriorating. Physically not robust. Slight right hemiplegia. First fit aged 2. Now has about three isolated majors a month, and, in addition, about two attacks of status epilepticus, lasting 15 to 60 minutes, a year.

No. 30 (V. T.). Male, aged 16. Father had convulsions during teething, and mother's mother died of asthma. Mentally and physically normal. First fit aged 7, ascribed to measles. Major attacks average two a month. Also very large numbers of slight attacks consisting of jerking head and eyes to right, and lasting two or three seconds. (These were diagnosed at one time as a sternomastoid tic.) Luminal partly controls the majors, but neither it nor any other drug influences the minor attacks. Occasionally free from minor attacks for a day or two, but more often they occur almost continuously for some hours.

No. 31 (A. H. M.). Male, aged 14. Family history clear. Physically and mentally normal. Many scars due to falling in attacks. First fit aged 7. Very frequent short attacks with loss of consciousness. Often falls. Rapid return of consciousness. May have a day or two free from attacks; on other days attacks are practically continuous. Bromide and luminal medication useless. ? A case of pyknolepsy.

No. 32 (A. G. M.). (See No. 11 above.)

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References.

1. Bloor, W. R., Pelkan, K. F., and Allen, D. N.: Jour. Biol. Chem., 1922, lii., 191.
2. Campbell, J. M. H.: Quart. Jour. Med., 1925, xviii., 393.
3. De Crinis, M.: Quoted by Lennox and Cobb, Medicine, 1928, vii., 108.
4. Goodall, E.: THE LANCET, 1929, i., 384.
5. Osnato, M., Killian, J. A., Garcia, T., and Mattice, M. R.: Brain, 1927, i., 581.
6. Pezzali, G.: Quoted by Lennox and Cobb (above).
7. Popéa, A., and Vicol, A.: Compt. rend. Soc. Biol., 1925, xciii., 747.
8. Robinson, S. H. G., Brain, W. R., and Kay, H. D.: THE LANCET, 1927, ii., 325.
9. Sackett, G.: Jour. Biol. Chem., 1925, lxiv., 203.

COMPLICATIONS AND MORTALITY OF APPENDICITIS.

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APPENDICITIS, like many other evils, appears to be a by-product of our modern, high-speed, material "civilisation." At any rate, that is the impression left after reading the painstaking researches of Short[1] and others. In spite of the advances of surgery the total death-rate for the disease is not diminishing in this country, while in the United States it increased 30 per cent. in the first 20 years of the century.

TABLE I.—*Mortality per Million from Appendicitis* (Willis,[2] Adams,[3] and H. H. Greenwood[4]).

	U.S.A.			*British Isles.*				
Year ..	*1901*	*1911*	*1921*	*1913*	*1918*	*1921*	*1924*	*1927*
	110	120	144	69	66	72	74	70

The figures given in Table I. are not the same as the case-mortality and do not explain whether the disease is more common or whether it actually has a higher mortality. As it was rare before the latter years of the last century there can be little doubt that it is now more common. Is the increasing mortality in the country where the Ochsner treatment had its origin due to this expectant treatment? This seems hardly likely from the figures given by institutions where it is practised. More probably the disease has become more common or more severe in character.

Comparison with other Abdominal Urgencies.

Some years ago I investigated the results at the London Hospital, taking two periods of a few years each, first about 1900 and then about 1914. The percentage mortality was as shown in Table II.

TABLE II.—*Percentage Mortality.*

Year.	Appendicitis.	Perforated gastric ulcer.	Intestinal obstruction.
1900	27	66	50
1914	6	40	39

I ascribe the improvement to recognition of the importance of early operation and to better after-treatment, principally the use of Fowler's position. While the statistics for institutions have improved, the general death-rate from these diseases has not fallen proportionately. The figures given by Willis[2] for the United States and Greenwood[4] for this country are as given in Table III.

TABLE III.—*Mortality per Million.*

U.S.A.			*Great Britain.*			
Year.	Appendicitis.	Hernia and obstruction.	Year.	Appendicitis.	Hernia.	Obstruction.
1901 ..	110	130	1918 ..	65	64	81
1910 ..	120	120	1927 ..	70	50	64
1921 ..	140	106				

The falling mortality of intestinal obstruction is curious, for in hospital cases the improvement seems so small compared with that obtained for cases where the peritoneum is involved—viz., appendicitis and perforated gastric ulcer. During the same number of years I met 1000 cases of appendicitis and 150 of intestinal obstruction and had practically the same number of deaths in each group—viz., 50—which agrees closely with the published figures.

Case-mortality.

I should put the case-mortality at about 5 per cent. or rather more, judging from my own experience for

the past 20 years and the results of other surgeons who give long series. An analysis of cases gives the impression that there is a great variation in the severity of the disease from time to time (Table IV.).

TABLE IV.—*Comparison of Case-mortalities.*

—	Cases.	Mortality per cent.	Date.
Grey Turner[5] ..	1339	5·7	1909–1929
McNeil Love[6] { 607 expectant		3·8	} 1920–1924
McNeil Love[6] { 2706 immediate		6·7	}
Gatch and Durman[7]	262	7·2	1924
Greenwood[4] ..	206	—	1927–1929
Warren	1072	6·0	1909–1929

Factors likely to affect the mortality are: (*a*) period, (*b*) age, (*c*) sex, (*d*) accidental complications, (*e*) severity of infection and natural complications, and (*f*) treatment.

(*a*) *Period.*—In my own cases there was a notable difference in series at different times (Table V.).

TABLE V.

Date.	Cases.	Bad cases (per cent.).	Secondary operations (per cent.).	Mortality (per cent.).
Pre-war, 1910–14 ..	433	9·2 }	3·5 {	4·3
War, 1914–17	268	10·4 }		7·4
Immediate post-war, 1919	184	11·4	6·5	8·7
Late post-war, 1921–28	187	9·6	1·5	4·8

The cases labelled "bad" were those with spreading peritonitis or intestinal obstruction or both. It is difficult to grade cases according to severity; the surgeon has to go partly by the general and local condition of the patient and partly by what he finds at operation. Since it is, as a rule, advisable to explore as little of the abdomen as is compatible with dealing with the mischief, it is often impossible to say how far the peritonitis has spread. Grey Turner, in a very interesting communication, reports 1339 acute cases, of which 116 had diffuse peritonitis or severe primary complications, such as intestinal obstruction or pylephlebitis, with a mortality of 33 per cent. He separated off groups of cases with flank peritonitis or localised abscess which, together with simple acute cases—i.e., those without peritonitis (1160 in number)—had a mortality of 2·9 per cent. My observations and notes are not accurate enough for such subdivision, but of 1072 acute cases there were 107 with diffuse peritonitis or obstruction or a combination of these, with a mortality of 41 per cent. The remaining 965, including abscesses, localised peritonitis, and simple inflamed appendices, showed a mortality of 2·6 per cent., which agrees closely with Turner's figures for this class of case.

The 1910–14 cases were consecutive at the London Hospital, as were the next group during the war. There is a higher mortality and slightly higher percentage of severe cases among the second group, and I suggest that this is caused by malnutrition and the absence of many abled-bodied patients who would probably have a lower mortality (see under Age). As a matter of fact, the latter would probably be cancelled out by the greater proportional number of women, whose resistance seems to be higher. The next group forms an interesting series. They occurred immediately after the war, when deficient feeding and the great influenza epidemic may have lowered the resistance of the nation. In addition the series includes practically all the night emergencies at the London Hospital for some months. All these factors together probably account for the poor results, for although the incidence of severe cases only showed an increase of 2 per cent. the patients responded badly to treatment, and there were severe and unusual complications, such as secondary hæmorrhage, wide sloughing of the abdominal wall, and an unusual number of secondary operations—viz., 6·5 per cent., compared with 3·5 per cent. for 1910–17.

The next series, for contrast, represents a practice in an agricultural district. The figures suggest a mortality about the same as that of London in peacetime, but the true mortality is lower, for amongst the nine cases which died the following things happened.

1. A woman who had had an acutely inflamed appendix removed without drainage had done well and was about to get up 14 days after operation when she became acutely ill with signs of some great abdominal urgency. Laparotomy revealed thrombosis of the inferior mesenteric vessels and gangrene and carcinoma of the sigmoid colon.

2. An old man of 65 with myocardial degeneration and fibrillation had an acute appendicitis with abscess. The appendix was removed, and the abscess drained and healed in a few days, but 16 days later, before he left hospital, he succumbed to his cardiac condition.

3. A girl of 6 developed a general peritonitis in 36 hours. At operation there was turbid fluid and lymph all over the intestines and the appendix was slightly inflamed; she died in a few days. It was probably a case of pneumococcal or streptococcal peritonitis, but in the absence of bacteriological evidence I felt obliged to include the case in the appendicitis series.

Excluding these cases, the mortality is a little over 3 per cent.

(*b*) *Age.*—Next to early diagnosis the patient's age is the most important factor affecting the mortality (Table VI.).

TABLE VI.

Age.	Cases.	Complicated cases.	Died.	Mortality per cent.
0–5	21	5	3	14
5–10	122	13	11	9·0
10–15	197	13	12	6·0
15–20	191	20	11	5·7
20–30	284	17	10	3·5
30–40	131	9	3	2·3
40–50	63	14	6	9·5
50–60	47	10	7	14
60–70	11	3	3	37
70–80	7	1	—	—

The mortality diminishes rapidly after the first decade and slowly falls until about the fortieth year, when it again rises sharply. It is curious, but probably only a coincidence, that none of the septuagenarians died. The reason for the greater mortality at the two extremes of life are: (1) The difficulty in diagnosis in children, in whom early appendicitis is often mistaken for dietary indiscretion and unfortunately often treated by parents with a purge. (2) The young also show an inferior resistance to acute infections—e.g., peritonitis. (3) The more elderly seem to have diminished sensibility, so that they take little notice of pain in the abdomen until their condition has become serious. The pain of an incipient appendicitis is probably less severe than that of an intestinal colic from some dietary lapse, and is disregarded. It is surprising how slightly persons of a certain age show the severity of the trouble either subjectively or objectively; for instance, a man of 58 was regarded by his doctor as a case of subacute intestinal obstruction as he had had neither increased pulse-rate nor fever for a week. Two days before I saw him he was relieved by an enema, shortly after which he began to have pain and distension. When I saw him he was distended, and my impression was that of a subacute obstruction which had become acute, probably because of a growth in the colon. Operation, however, revealed fibrino-purulent peritonitis and obstruction from a gangrenous appendix. Cases like this are unfortunately not uncommon, and have a high mortality.

TABLE VII.

Sex.	Number.	Died.	Mortality per cent.
Male	575	40	7
Female	480	25	5·

(*c*) *Sex.*—As might be expected, the female sex, with its greater power of passive resistance, shows a slightly lower mortality (Table VII.).

(*d*) *Accidental Complications.*—By these I mean accessory diseases which either lower the resistance or actually kill the patient, who may have practically recovered from his appendicitis. Mention has already been made of myocardial degeneration, thrombosis of the mesenteric vessels, and gangrene of the colon; to these may be added diabetes, perforation of a duodenal ulcer, and pulmonary embolism. Most of these cases should really be excluded, but it is invidious to make a distinction. These casual complications formed one-sixth of the total deaths.

(*e*) *Direct Complications.*—These are peritonitis, intestinal obstruction and combinations of the two, and are the important causes of death in appendicitis. Direct complications form a large percentage of the whole. In 1072 cases there were 107 direct complications—i.e., 10 per cent., and of these 44 died—i.e., two-thirds of all the deaths. It is often difficult at operation to settle the degree of spread of peritonitis. I have retained the term "spreading peritonitis" for cases where there was matting of intestines by recent lymph with loculated pockets filled with pus, more or less foul, together with redness and distension of the intestine. The type of case where there is merely turbid or semipurulent fluid, widely disseminated amongst the intestines, but without lymph and with but little redness or distension of the intestine (which clinically often suggest peritonitis) have not been included under this heading. Such cases mostly have a fairly smooth recovery, though they may pass into the more severe type. The rate of spread and virulence of a peritonitis cannot be measured in time, but only by the severity of the infection and the resisting powers of the individual's peritoneum. It is almost impossible to say whether a condition of local peritonitis is an early stage of a severe infection, which will probably advance rapidly, or a later stage in a condition which is to some degree held under control by the natural defences of the peritoneum. A good many cases of spreading peritonitis recover; my impression is that those which die are either late, owing to neglect or wrong diagnosis, or especially virulent infections—e.g., streptococcal cases.

Intestinal Obstruction.

These cases form an interesting group, to which insufficient attention has been directed. In 1924 [8] I collected my cases and found that I had met 34 during a period in which I had seen 1011 cases of acute appendicitis, but some of the cases had followed operations by other surgeons. In the present series of 1072 patients there were 32 cases of obstruction or obstruction combined with peritonitis. In 1924 I reported 180 cases of obstruction; 68 were strictures, 40 intussusceptions, and 54 bands and kinks. Of the last group no less than 34 were directly due to appendicitis. I do not know how many I have missed and confused with peritonitis. During the discussion on my paper one surgeon of great experience stated that he had never met with the condition, which makes me think that it is often confused with peritonitis and paralytic ileus. The literature on this subject is not extensive; Harrigan [9] describes 8 cases, of which only 3 were immediately post-operative; Rayner [10] notes 3 cases out of 126 cases of appendicitis; Carlson and Marshall [11] among 875 cases of appendicitis found 15 cases of obstruction, of which 8 were immediately post-operative. They make the pertinent remark that possibly a good many cases labelled "acute dilatation of the stomach" are really obstruction of the small gut by lymph bands and peritonitis.

Clinically cases of obstruction due to appendicitis fall into two main groups: (1) primary, and (2) post-operative; the latter may be further divided into immediate and late. By immediate I mean cases which demand attention whilst still in hospital for the primary operation. The late post-operative cases may occur weeks, months, or years after the operation or attack of appendicitis and do not come into the discussion here, though they form a notable percentage of all cases of obstruction of the bowel due to bands and kinks.

Primary Obstruction.

As a rule the whole affair is recent and acute; the symptoms are like those of acute obstruction, but probably with some fever and localised tenderness and resistance in the right iliac fossa, suggesting something more than a simple obstruction. Of this type the following is a good example:—

A woman aged 70 had been ill for 24 hours with repeated vomiting, abdominal distension, and constipation. The temperature was subnormal, the pulse normal, and the right iliac fossa tender. Laparotomy was performed immediately, and showed an acutely inflamed appendix adherent to and kinking the lower ileum, with marked distension of the gut above and emptiness below. Removal of the appendix from its lymph bed automatically released the gut and the patient made a good recovery.

A similar clinical picture may be produced by cancerous obstruction of the lower colon with distension of a cæcum, which is becoming ulcerated and perhaps beginning to leak. In middle-aged or elderly persons the distinction between these two conditions is extremely difficult. The following is a less common type:—

A boy aged 8 suffered from belly-ache and occasional vomiting for a month. His appetite was bad, his temperature irregular, and he sweated at night. For two days before I saw him the vomiting had been more urgent and the bowels confined. When seen he had a typical abdominal facies, marked distension of the abdomen, and visible peristalsis of small intestine; his temperature was 100°F. and his pulse-rate 100. Laparotomy was done immediately, and it was found that two or three feet of the ileum immediately above the cæcum were kinked and matted by adhesions. The ileum above was dilated and the colon below collapsed. An acutely inflamed appendix was removed from the middle of the matted coils of intestine and adhesions broken down. As it was uncertain whether the intestinal contents could pass along such a length of damaged intestine, a lateral anastomosis was made between the ileum, above the kinked part, and the cæcum. A valvular cæcostomy was done at the same time and the patient made a good recovery.

Post-operative Obstruction.

This type is pathologically similar to the last, but in addition there is frequently suppurative peritonitis—i.e., pockets of foul pus between adherent coils of intestine. Clinically, in my experience it is commoner and more fatal than the primary variety. The danger is in part due to the greater difficulty of diagnosis, for it is not easy in the early stages to distinguish atonic ileus or early-spreading peritonitis from obstruction caused by a recently formed lymph band. This is partly because the patient has been ill longer and has already been through one operation, so that his vitality is depressed. Complete diagnosis may not be easy, but is less important in the primary cases, since in these it is usually fairly clear that the condition is one of abdominal urgency with signs pointing partly to obstruction and partly to some inflammatory affection, and immediate operation is definitely indicated. The main point is to open the abdomen by the paramedian rather than the iliac incision, so as to give plenty of room if adhesions have to be dealt with or an anastomosis formed.

In the post-operative type diagnosis may be difficult and is extremely important, for, on the one hand, a true mechanical obstruction has to be relieved, and, on the other, inflamed intestine should not be handled and abused if the condition is really a simple peritonitis. The sudden onset of paroxysmal abdominal pains, with rising pulse-rate and falling temperature, in a patient who has been going on smoothly after the original operation is suggestive. When associated with bilious vomit, becoming brown, and a soft abdomen, there is almost certainly obstruction, and there should be little hesitation in operating. Visible peristalsis of the small intestine is, of course, decisive, but to wait for its appearance is to incur grave risks, for it occurs late in the more acute obstructions. Where there is a mixture of obstruction with suppurative peritonitis, diagnosis and treatment are alike difficult, but I cannot help thinking that in some cases expectant measures are adopted when operation would be better.

The following is a fairly typical example :—

A boy of 17 who had been ill for one day was operated on and a gangrenous appendix was removed ; there was foul pus in the pelvis, which was drained. Three days later, after good progress, there was severe abdominal pain and vomiting, but an enema gave relief. The next day, as pain and vomiting recurred, the abdomen was opened and the small intestine was found distended above a mass of matted intestine with pockets of pus. The adhesions were freed, a valvular ileostomy with catheter was made in the ileum above the obstruction, and a pelvic drain was reinserted ; the patient made a good recovery and was out in a month. Catheter drainage of the ileum in such cases is a life-saving measure and the wound usually heals up in two to three weeks at the latest.

I cannot help thinking that some of the cases called " post-operative obstruction " really had obstruction at the start, but, owing to the small amount seen at operation, obstruction was missed. In the worst class of case the surgeon is on the horns of a dilemma, since too much zeal in breaking down adhesions may spread infection further, yet adhesions must be freed if they cause obstruction.

(*f*) *Treatment.*—We are all agreed that the diseased appendix is best removed, but there is some diversity of opinion as to when exactly this is best done. The main point at issue is the treatment of cases which have been in progress some time, for practically all surgeons admit that in early cases immediate appendicectomy is the safest course. In cases which have lasted some time the bulk of surgeons advocate immediate operation in almost every case, but there is quite a considerable school which adopts expectant measures based on the teaching of Ochsner. These consist mainly in placing the patient in the Fowler position, giving no fluid by mouth, but only rectal saline as nourishment, and possibly also morphia, but only operating if the condition becomes worse. Very good results are claimed by the advocates of this method, but it must be remembered that cases so treated are to some degree selected and very possibly include only those which would have done equally well if operated on immediately. Unless the figures include all the appendicitis cases met with over a reasonably long period the conclusions are not sound. Adams[3] gives the following figures for comparison, quoting Love's statistics for the London Hospital (Table VIII.).

TABLE VIII.

	Cases Treated Expectantly.			*Cases Treated by Immediate Operation.*		
—	No.	Died.	Mortality per cent.	No.	Died.	Mortality per cent.
London Hosp.	341	12	3·5	1677	98	5·8
St. Thomas's..	214	9	4·2	901	76	8·4

Adams points out that in the latter series there were over 400 cases of general peritonitis with a mortality of 20–30 per cent., and raises the question whether the series treated expectantly contained the same proportion of severe cases—i.e., whether it was a straight series without selection. Deaver and Magown[12] give copious statistics from the Lankenau Clinic from which I quote a few figures.

Of 5488 operations for acute appendicitis, from 1901 to 1919, 327 died.

1901–05	..	Mortality percentage	10·5
1906–10	..	,, ,, ...	5·6*
1910–15	..	,, ,, ...	3·7*
1915–21	..	,, ,, ...	4·2*

* Ochsner treatment adopted.

In 1918 the mortality was 5·2 per cent., showing the same increase from war and influenza that I found in my own cases. Ashurst[13] gives an account only of severe cases—i.e., those which were drained, as follows : immediate operation, 210 ; mortality, 10 per cent. ; delayed operation and Ochsner treatment : mortality, 35 per cent. Of the latter group, six cases died without any operation, being too ill for it.

Ashurst gives a useful hint about the diagnosis of diffuse peritonitis—viz., that rigidity alone is often associated with the presence of an exudate of turbid fluid in the peritoneum, which is relatively innocuous and often does not need drainage, but if distension is present as well there is probably a definite fibrino-purulent peritonitis. He shrewdly adds that surgeons who practise delay may claim as successes due to delay cases which would do equally well if treated by immediate operation ; " only those who look inside the abdomen can know the true condition of affairs during the acute stage." Willis[2] quotes Ochsner as having a mortality of 4·5 per cent. in the early years of the century and one of 2 per cent. in 1924, but gives no details of the number of cases and whether they were a straight sequence.

The advantage claimed by the upholders of expectant treatment over immediate operation seems therefore to be not more than 2–3 per cent., which is less than the differences I have found in my own cases, all treated on very similar lines in series occurring at different times, so that it is hard to believe that waiting is any great advantage. Love,[6] who advocates expectant treatment, does not seem wholly wedded to this method, as he states that in general peritonitis appendicectomy is advisable if possible. It is clear that the cases treated on expectant lines are selected cases and not a straight series. In the same way a surgeon might claim that drainage is bad because the mortality of drained cases is 10 per cent., while of undrained it is about 0·75 per cent.

Time of Election for Operation.

A good deal of stress has been laid upon the danger of operating at a certain period of the disease. This is put variously ; perhaps the most usual is to regard the third to fifth day as the time to avoid operation. Personally I find the disease advances with very varying rapidity ; some cases are no further advanced in three days than others in 24 hours. Some have spreading peritonitis after a day ; others after a week have little but lymph round the inflamed appendix. There can be little doubt that many patients do not notice the earlier symptoms or put them down to dietary indiscretions, and only seek advice when the appendix is perforated or a localised abscess has burst and the condition is serious. Adams[3] remarks that there may be marked pathological changes in an appendix which causes no pain at all and may certainly give rise to no vomiting ; if so, the patient may easily make an error of 48 hours in the length of the history he gives. With this view I entirely agree. The expectant method demands enormous care in watching for any adverse symptoms which may suggest immediate operation. Pulse-rate and temperature will have to be taken two-hourly and the abdomen must be frequently inspected ; even then mistakes are easy. One case of this type always recurs to me.

At a children's hospital the resident one morning said to me : " I wish you would see a child who, I thought, had appendicitis last night, but to-day I am not at all sure about it, and think I may have been mistaken." I examined the boy and could find no tenderness or rigidity of the abdomen ; there was no pain and the pulse and temperature were normal. Knowing the resident to be a careful man I replied : " Although I can find no signs now, since you found them last night I believe it is wisest to operate." I did so, and found a completely gangrenous appendix with little or no effusion. The child made a speedy recovery ; waiting might have meant disaster.

I have met with many similar cases though seldom quite so dramatically. Another danger arises from mistakes in diagnosis. I well remember a former colleague of mine telling a story against himself. He had decided to adopt the plan of waiting between the third and fifth day in cases of appendicitis with a mass in the right iliac fossa. The first case on which the plan was tried proved to be one that did not improve; so laparotomy was done next day and revealed an intussusception. A twisted ovarian cyst may mislead in the same way, though this is a less serious error. A distended and leaking cæcum above a cancer of the colon, or a slowly leaking duodenal ulcer, might be

mistaken for appendicitis, with disastrous results if the patient be treated on expectant lines.

I feel that one cannot judge the condition of the appendix with sufficient surety by the clinical progress of the case, for the condition found at operation is frequently more severe than would be expected from the physical signs. (The converse also is true, but of less consequence.) Expectant treatment can only be used in institutions where the patient is constantly under skilled observation, and even then it may have to be given up for active measures, with loss of valuable time and additional danger. My impression is that delay should only be practised where conditions are very unfavourable for operation, either because the patient has some additional disease such as pneumonia, nephritis, and diabetes, and the appendicitis does not appear to be severe, or where the local conditions, as at sea or far from civilised appliances render the success of any operation problematical.

Scope of the Operation.

It is very important to consider how much should be done in the more severe cases. It is just as important not to do too much as to do too little. In the earlier cases the appendix can usually be removed with little difficulty, but where the disease has been present for some time it may be wiser simply to drain any abscess (it should be noted that it is easy to miss loculations of pus, where more than one are present) and leave the appendix for a future operation. I find that I fail to remove the appendix in about 1 case in 20. Judging from the remarks of Love, some surgeons are too anxious to remove the appendix at all hazards in every case, and thus sometimes do harm by breaking down adhesions and spreading infection. If the appendix does not come to hand in about five minutes, it is best to be satisfied with opening the collections of pus in cases where the adhesions are many, dense, thick, and œdematous. The only reason for going further is the relief of obstruction, where this is present, by division of adhesions and possibly by cæcostomy or ileostomy. Except in the more difficult cases such an operation will not take more than 10 to 15 minutes and may not take more than five.

The Incision.

This will depend on the type of case and the habits of the surgeon. The muscle-splitting, paramedial, and pararectal lines of approach all have staunch advocates, and I note that Grey Turner [6] recommends muscle-cutting in the right iliac fossa for cases where drainage is needed. I was not impressed with the results of this method which I used to see when I was house surgeon, and I determined never to use it. In those days it led to trouble from vomiting and prolapse of intestine. But this may have been due to the use of heavy gauze packs as well as to the type of incision. I have made more use of the muscle-splitting incision than any other, but where the diagnosis is uncertain or complications, such as obstruction are likely, and in women, I frequently employ the paramedial, displacing the rectus muscle outwards. Some surgeons think that drainage through the muscle-splitting incision is poor, and suggest a suprapubic stab, but I have not been struck by any great advantage in this. In about 4 per cent. of all cases in this series there was need for a secondary operation for draining a residual abscess or for obstruction. The advantages of an incision in the right iliac fossa in the early definite cases are obvious, as there is far less risk of spreading infection amongst the small intestines; moreover, it is much easier (and therefore safer) to reach the appendix, and by extending the splits in the layers of muscles widely a very free exposure can be obtained. Where the condition is advanced the problem is somewhat different, as the surgeon must be able to cope readily with pockets of pus disseminated amongst the coils of small intestine and to relieve any mechanical obstruction. The nicest judgment is needed if he is to exert the right amount of interference in these patients, for in one case the adhesions may be walling off infection from susceptible areas and in another a quite recent and apparently delicate band of lymph, which is broken by a touch, may be obstructing a loop of ileum quite as effectively as an organised fibrous band. He should keep a very sharp look out for coils of distended small intestine, and if, when he has broken down lymph bands, the coils do not readily empty into the lower intestine, a valvular enterostomy may save life and be useful both for the administration of saline and the evacuation of gas and liquid fæces.

Drainage.

The percentage of cases drained is some criterion of the severity of the series, but allowance must be made for the predilections of individual surgeons, whose ideas of when to drain vary considerably. Greenwood,[4] who must be congratulated on recording the most successful series of cases, gives the impression that he drained only 18 per cent. and that Grey Turner drained 26 per cent. (My interpretation of the latter's communication is that more than half were drained, and expresses surprise that Flint records 1080 acute cases from Leeds, of which presumably half required drainage. I have drained about half my cases. All this goes to support my view that appendicitis varies in severity from causes associated with time and place. Greenwood advocates draining through the loin when pus is present there. This sounds reasonable, but in my earlier days I remember seeing this done fairly often and always being struck by the way pus refused to come out of a loin tube, even when the patient was lying on his back (I refer to the days before Fowler's position was employed), while it came readily through a tube in the right iliac fossa. Consequently I have never employed this mode of drainage.

Drainage through a muscle-splitting incision is said to be bad, but I have not found it so. In about 4 per cent. of my cases a secondary operation was needed for residual abscess or obstruction, and, while it is true that some of these were in patients operated through the right iliac fossa, others had been done through the paramedial route. My usual plan is to keep a tube down into the pelvis (when this needs draining) for two days and then shorten the tube, so that it just goes through the abdominal wall; I usually omit it about two days later. If the tube comes out too early a residual abscess may form, but if it is left in too long the pressure may cause a fæcal fistula. More than one-third of the cases of obstruction occurred before any operation was done, but the possibility of a drainage-tube causing complications such as obstruction makes it important to take the tube out as soon as possible.

Conclusions.

1. Appendicitis appears to be developing a more severe character or is more common.

2. The disease shows a considerable variation in its severity, depending on time and place; the mortality in my experience varies from 3 to 10 per cent.

3. Expectant treatment may give good results in certain hands, but as a general measure its advantages are not proved and its wide adoption might lead to further disasters. The mortality is greatest in children, who are certainly not cases for expectant treatment, owing to the rapid and insidious way in which complications, such as peritonitis, develop in young subjects, and their liability to acidosis from starvation.

4. Early diagnosis and immediate operation are the counsels of perfection, but failure to diagnose early is by no means always the fault of the practitioner, for in children and old people the diagnosis may be quite difficult, and many persons regard a stomach-ache too lightly and do not send for the doctor till they have developed a well-marked peritonitis.

5. The main causes of death are peritonitis and mechanical obstruction; the latter can be very largely prevented by suitable technique at operation, and a careful watch should be kept for this important complication.

(Bibliography at foot of opposite page.)

Clinical and Laboratory Notes.

ACCESSORY SPLEEN WITH RECURRING TORSION OF ITS PEDICLE.

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CASES of accessory spleen giving rise to symptoms which call for surgical interference are rare. In 1914 I published, with Archibald Romanes, a paper[1] recording a case which came under our observation and giving a short review of similar cases from the literature. The interest of the present case is enhanced by the fact that, owing to its resemblance to the former case, a correct preoperative diagnosis was made.

A housewife, aged 35, was admitted to my wards in the Dundee Royal Infirmary in June, 1926, on the recommendation of Dr. J. Wilson of Anstruther. She complained of recurring attacks of pain in the abdomen, and of a lump, which she had felt in various situations in the abdomen. The pain was of a burning character and the attacks lasted about three days. During the two years previous to admission, the interval between the attacks had gradually diminished from six to two months. The pain was situated above and to the left of the umbilicus, and usually came on when she was tired; it was more severe if it coincided with a menstrual period. It was not accompanied by vomiting, but there was sometimes a feeling of nausea when she stooped. During the attacks of pain she had felt a lump in the upper abdomen "about the size of a small orange," and she volunteered the statement that the lump was larger during the menstrual period. Between the attacks she felt well; there was no dyspepsia, and the bowels moved freely. She had lost weight during the preceding four months. There was a family history of tuberculosis, and after the birth of her first child some years ago she had had a bilateral pleural effusion which had taken some time to clear up.

She was a woman of poor physique and looked rather tired. The abdomen moved freely, and from time to time one could grasp a firm spherical tumour, about the size of a tangerine orange. It was tender to touch and could be moved rather freely about the abdomen. There was no ascites and the percussion note showed no enlargement of the liver or spleen. Rectal examination was negative. Radiographic examination with and without barium failed to reveal any abnormality in the alimentary tract. The blood count showed some increase of the red cells—viz., 6,050,000.

I was encouraged by the resemblance to the former case to make the preoperative diagnosis of accessory spleen with recurring torsion of the pedicle. The possible alternatives were an omental cyst, or a mass of tuberculous glands. The latter would possibly have shown calcified areas in a radiogram. The increase in size of the tumour during the menstrual period suggested that it was of glandular origin.

On June 13th laparotomy was performed under general anæsthesia. A perfectly spherical red tumour was found attached by a thin pedicle about three inches in length to the centre of the anterior aspect of the gastro-hepatic omentum, the pedicle allowing the tumour to swing freely in the abdomen. The pedicle was ligated and the spleniculus removed. The spleen was normal in size and position, and no other spleniculus was detected. The other abdominal viscera were normal, except the appendix, which was long and buried in adhesions. This was removed and the abdomen closed. Recovery was uneventful.

It seems probable that up to two years before the operation the spleniculus was sessile and gave rise to no symptoms, their onset being determined by the formation of the pedicle, torsion of which produced congestion in the organ with resulting pain. Prof. L. R. Sutherland reported that the section on microscopic examination showed the appearance of normal spleen; there was no evidence of hæmorrhages or fibrosis, as was seen in the specimen from the previous case.

Since the publication of the previous paper, I have sometimes noted the presence of small spleniculi at operations. None has been larger than a filbert. I have occasionally found them in relation to the greater curvature of the stomach when I was performing partial gastrectomy frequently in the pedicle of the spleen near its hilum, and occasionally in the great omentum. I have seen no record of other cases similar to the two I have recorded, but R. Finaly[2] notes the presence of an accessory spleen in the sac of a left inguinal hernia, the spleen being attached to the upper pole of the epididymis. He quotes a case reported by Sneath where an accessory spleen simulated a third testis and was connected by fine cord-like attachments to the normal spleen.

[1] THE LANCET, 1914, ii., 1089.

THE USE OF BONE-PLATES IN THE TREATMENT OF FRACTURES.

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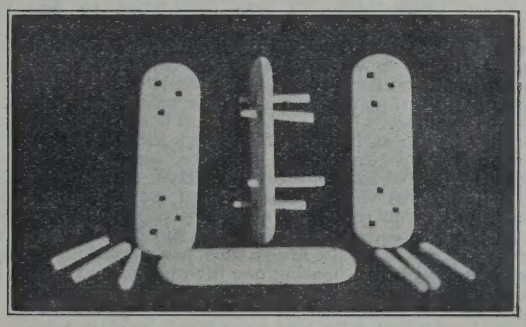
DURING 1920, when I was visiting surgeon on the staff of the Orthopædic Hospital, Beckett Park, Leeds, I used bone-plates and bone-pegs in six cases of ununited fracture of the humerus and showed the later successful cases at the Leeds and West Riding Medico-Chirurgical Society. The idea originated in a paper by Gallie and Robertson,[3] although Hey Groves[4] had



Bone-plates and pegs.

previously used bone-plates fixed by metal pegs in a somewhat similar manner. To avoid the elaborate and tedious manufacture of bone-screws with the tapping-out of corresponding holes in the bones, I used bone-pegs square in section and tapering slightly. I found that these grip sufficiently firm to hold the fractured ends in good apposition and can be expeditiously inserted. I have continued to use them for certain cases ever since and find that their sphere of usefulness lies mainly in the more deeply seated fractures, where a subsequent operation for the removal of a metal plate which has, so to speak, outworn its welcome, is a serious undertaking. For the more easily accessible

[2] Nederland. Tijdschr. v. Geneesk., July 24th, 1926, p. 397 (quoted in Brit. Med. Jour. Epitome of Current Med. Lit., 1926, ii., 49).

[3] Gallie, W., E. and Robertson, D. E.: Brit. Jour. of Surg., 1919, vii., 211–262.

[4] Groves, E. W. H.: Ibid., 1918, p. 230.

Mr. R. Warren: Bibliography.

(Continued from previous page.)

1. Short, Rendle: Brit. Jour. Surg., October, 1920.
2. Willis, A. M.: Surg., Gyn., and Obst., March, 1926, xlii., 318.
3. Adams, J. E.: Brit. Med. Jour., 1925, i., 723
4. Greenwood, H. H.: THE LANCET, 1929, i., 973.
5. Love, R. J. McN.: Ibid., 1929, i., 375.
6. Turner, G. G.: Ibid., 1929, i., 465.
7. Gatch, W. D., and Durman, D. C.: Ann. Surg., Part 378, June, 1924, p. 862.
8. Warren, R.: Bristol Med.-Chir. Jour., 1925, xlii., 23.
9. Harrigan, A. H.: Surg., Gyn., and Obst., June, 1919, xxviii., 561.
10. Rayner, H. H.: Brit. Med. Jour., 1924, i., 855.
11. Carlson, G. W., and Marshall, V. F.: Ann. Surg., Part 406, October, 1926, p. 583.
12. Deaver, J. B., and Magown, J. A. H.: Ibid., Part 328, June, 1924, p. 854.
13. Ashurst, A. P. C.: Ibid., Part 409, January, 1927, p. 89.

fractures, such as those near the distal end of the radius, ulna, or tibia, the metal plate can still claim advantages which scarcely need emphasising.

The accompanying photograph illustrates plates and pegs. The pegs are shown inserted in the upper plate in position, but they are too large for the holes and should sink through for about three-quarters of their length. After being driven home the projecting ends are nipped off with sharp bone-forceps and the rough end filed down level with the plate. Care should be taken not to use too powerful a blow when driving in the pegs, lest the plate be split. The bone-plates are slightly hollowed on the under surface to allow of close apposition to the bone. Both plates and pegs are prepared as Mr. Hamilton Bailey[5] directs, that is, by boiling for 20 minutes on three successive days. Their strength is apt to become impaired by too prolonged boiling.

A CASE OF SPASM OF THE CERVIX UTERI.

BY L. J. GREEN, M.R.C.S. ENG.

I SHOULD like to know whether the following case is to be regarded as exceptional.

The patient, aged 25 and healthy, had had one previous uneventful confinement, and was first seen in labour at 8 A.M. The abdomen was much distended, the os four-fifths dilated, the membranes bulging but unruptured, and no part could be felt presenting. Pains, felt only in the lower abdomen, were occurring every three minutes. The patient, having had no sleep, was tired out, labour having commenced at 6 P.M. on the previous evening. She was of a babyish type with small power of endurance and control, moaning and crying for help. The fœtal heart was heard beating to the left of the umbilicus. At 10.15 A.M. the condition of the os and membranes was unaltered, but the head could be felt presenting and the pains were stronger and felt in the sacral region.

At 1 P.M. the patient was screaming for "help," with such phrases as "take it from me." As the os seemed fully dilated and the patient was much exhausted and the abdomen was distended, it was deemed advisable to rupture the membranes. After doing so the hand was temporarily withdrawn from the vagina and the patient immediately re-examined to determine the exact presentation. I was astonished to find that the os was now only two-fifths dilated, the sensation imparted to the fingers unmistakably suggesting considerable muscular tone. I was so astonished that I examined the patient with unusual persistence and deliberation. It seemed certain that the previous diagnosis of full dilatation of the os must have been mistaken and that the patient was in reality in the early part of the first stage of labour. In view of her sleepless night and her poor psychological make-up I decided to adminster a sedative. She was informed that delivery was some distance ahead, advised to compose herself, and given omnopon gr. ½ hypodermically, whilst a hot enema was ordered to clean out the bowel, which was discharging a little fluid fæces with each pain. The fœtal heart was then heard beating one inch below and to the left of the umbilicus.

At 2.15 P.M. there was an urgent telephone message. A live, male child of 8 lb. had been born precipitately.

The only explanation of this case appears to be that following the manual rupture of the membranes, the cervix went into an unusually strong spasm which rapidly passed off. It is, of course, conceivable that I was mistaken (1) in the diagnosis that the os was fully dilated, made before rupture of the membranes; (2) in the diagnosis made after rupturing them that the os was only two-fifths. These possible errors can be eliminated (*a*) because the os was four-fifths at 8 A.M. and 10.15 A.M., (*b*) because of the particularly careful examination after finding that the os was two-fifths.

The spasm of the cervix may have been a neuro-muscular disorder due to a sleepless night, the patient being restless, weak-spirited, terrified, very fat and uncomfortably distended abdominally. But more remarkable than the sudden onset of the spasm is the rapidity, as acute as its onset, with which it must have subsided, with most humiliating sensations on the part of the obstetrician, who was not equal to the intellectual emergency and whose judgment must have seemed so wide of the mark. Was this rapid subsidence of the spasm of the cervix due, one wonders, to the omnopon and connected with the patient's immature psychological status?

[5] Bailey, Hamilton: THE LANCET, 1929, i., 820.

Medical Societies.

MEDICO-LEGAL SOCIETY.

AT a meeting of this Society held on June 27th, Sir WILLIAM WILLCOX took the chair, and Dr. E. TEMPLE GRAY read a paper entitled

THE MEDICO-LEGAL EXPERT IN FRANCE.

The difference between the status of the *médecin légiste* and that of the medico-legal expert in England was, he said, essentially due to the wide difference in legal procedure between the two countries, and especially to the difference in the position of witnesses. Crime was investigated by the officials of the Parquet, which was a department of the office of the Ministère Publique, and was so-called because they sat at a table below the bench, on the floor of the court. It was possible for the prosecutor to find himself, later on, on the bench to try the case with the earlier stages of which he had been concerned. All the evidence was heard in the form of statements, which were not taken on oath, and were known as *procès verbaux;* no oral evidence was heard until the actual trial before the superior court. When the case opened before the Cour d'Assise, the clerk read over the charge, the Ministère Publique might open, and the witnesses answered their names and retired to a separate room. They gave evidence, but could not be interrupted; they made speeches. The object of this procedure was, in theory, that their evidence should be spontaneous. In practice, however, they had plenty of time to prepare it. A witness might change a statement which he had made before the Parquet, and the court might listen to hearsay. Journalists, politicians, and professors of philosophy were in special request as witnesses. Cross-examination, as understood in this country, was quite unknown. Witnesses for the defence were heard, and the defending counsel spoke last. There was no summing-up, but the questions for the jury were agreed by both sides or fixed by the court.

Whereas medical witnesses in England enjoyed the same privileges and disabilities as other witnesses, in France their position was laid down specially in the civil code. *Médicins légistes* were organised into panels, which were composed of specialists in various departments of medicine, who need not possess the Diploma of Legal Medicine. The panel also contained a large number of men who in this country would be police surgeons. Besides this peculiar status, the medical witness in France had another privilege: the civil code imposed on him a very stringent *secret professionel.* The medical man was the first person mentioned in this provision, which gave a schedule of professions whose members were forbidden to divulge confidences they had received in their professional capacity. A third factor contributing to the authority of the medical witness was the great importance which the court attached to the written reports of evidence, and the small part played by oral testimony. These *procès verbals* were not verbal, but survived from mediæval times, when the police and other officers of State were unable to write. French law defined a large number of functionaries who were allowed to make verbal reports, which were accepted without question in a court of law.

The medical expert was, for all practical purposes, called by the judge; he was named in much the same way as an English coroner named his autopsist. An

expert "committed" to make an inquiry signed a declaration before the *juge d'instruction* that he would report on faith and conscience, and on his report, upon which he would probably not be cross-examined, depended the technical evidence which would come before the court. He was invited to say whether responsibility attached to any person, and whether any action should be taken on the preliminary police inquiry. In a case of rape, for instance, he might be asked to describe the signs of the victim's resistance, and when insanity was pleaded in defence he would report on the responsibility of the accused. If two alienists decided that an accused person was not responsible, their report would be more or less conclusive.

The Medico-Legal Institute of Paris.

In 1903, the old Morgue had received the name of the Medico-Legal Institute, partly in deference to popular prejudice, and partly because the serious teaching of medical jurisprudence began there in that year. The present building, a splendidly equipped affair, had been opened in 1923. The bodies of all persons who died in Paris under circumstances requiring investigation—roughly 2000 every year—were sent to the Institute, which was also the centre for all medico-legal inquiries and examinations for workmen's compensation. The finances were rather complicated, as they were divided among three bodies; the first two would roughly correspond to the Home Office and the London County Council, and the third, the medical faculty, had no counterpart in London. The building was organised into two departments. The first, which was more or less deserted, contained what was ominously called the reception room; the autoclave, for disinfecting the clothes of the bodies; a large *vestière*, in which all bodies were classified; and spacious refrigerating cellars where they were stored. Refrigeration was performed by an ammonia plant which only needed to be worked for six hours a day. Bodies were kept at about 10 degrees of frost before examination and at freezing-point afterwards. This provision greatly assisted the autopsist. Small refrigerating safes were provided for viscera and fœtuses. There were also a waiting-room and chapel. The second, the busy part, held the headquarters of the medico-legal school and the departments of identification, pathology, and toxicology. It contained post-mortem rooms; pathological, toxicological, and research laboratories, a library, and a museum. The Dean of the School presided over the *Service d'Identification*, which did for the police much work not necessarily performed by teaching authorities in this country, consisting roughly of the identification of weapons, clothes, and other material. The scientific side of the institute was presided over by the municipal authorities, who had full control of the material. In contrast to the practice in England, an expert who was not on the teaching staff could not perform autopsies in this department, and the students therefore lost the advantages of his experience.

Dr. Temple Gray referred to the special committee of the Medico-Legal Society, which had been appointed some years before to consider and report on the possibility of founding a similar institute in this country, and suggested that it should resume its work.

Discussion.

Dr. LETITIA FAIRFIELD said that the committee of the Society had left the situation in an unsatisfactory position, but that the obstacles to the plan were not always realised by the public. The first difficulty was the position of the coroner in this country. The coroner's court was a magnificent institution, but it would be difficult for a medico-legal institute to collect all the material into one centre, and have it examined and dealt with by experts under the authority of the criminal court, without encroaching on the province of the coroner. The second difficulty was constituted by the very complicated organisation of the University of London. Edinburgh and Glasgow, in which medical instruction was centralised, possessed excellent medico-legal institutes. In London, however, the concentration of teaching material in one centre would immediately create difficulties with the many medical schools. The third difficulty lay in the very intricate relations between the London County Council and the coroners' courts in the various boroughs. The fact, however, remained that there was a great need for a medico-legal institute in this country, not only to concentrate the best teaching of medico-legal methods, but also to ensure that crime should be dealt with in the most scientific and up-to-date manner, which, whatever the public might think, was not the case at present. All these difficulties were simple questions of organisation, and could be overcome. The real trouble was that it was nobody's business to defray the initial cost. To create an institution similar to that of Paris would require a considerable capital sum, and none of the various bodies concerned—the Home Office, the London County Council, and the University of London—felt sufficiently interested to justify the expenditure. If some great philanthropic donor could be induced to realise the vital importance of this project to British medicine, the other obstacles would very soon be overcome. This country performed some of the finest medico-legal work in the world, but instruction in the subject was not organised, and encountered unique barriers. Dr. Fairfield hoped that the committee would spare no pains to produce a solution.

Dr. E. MACNAMARA asked whether the defence also was allowed, under French law, to call expert witnesses, whether they were subject to cross-examination, and what importance was attached to their evidence as opposed to that of the official experts.

Mr. E. R. BOLTON suggested that the scope of the medico-legal institute should include the work of the analyst, which was closely allied to that of the doctor but was very little studied from the legal aspect. He felt that cross-examination was a vital part of expert evidence, and produced the most valuable testimony.

Mr. E. HINKS agreed with Mr. Bolton on the importance of the chemical side of medico-legal work. He quoted the remark of a legal friend that, in practice, everybody concerned in an English criminal trial knew the criminal's record, and suggested that in reality the English procedure might therefore not differ greatly from the French, in which the prisoner's antecedents were made public at the opening of the case.

Mr. A. CREW declared, on the contrary, that the jury, who had to decide the facts, did not know the prisoner's record, and that if they ascertained it by accident the trial was generally held to be invalid. He remarked that in this country the medico-legal expert was usually regarded with suspicion—in many cases rightly so—and inquired how he was regarded in the public opinion of France.

Sir BERNARD SPILSBURY corroborated Dr. Fairfield's exposition of the difficulties in the way of founding a medico-legal institute in London. When the institute came into being—for he regarded its foundation only as a matter of time—a fresh difficulty would arise, that of planning a building and an organisation for a volume of work which was now very difficult to estimate, but which would certainly be three times as heavy as that of Paris. It was hard to see how a large enough expert staff was to be recruited. There would, however, be little difficulty in centralising inquests, for recent legislation had permitted the transfer of a body from a coroner's court to any suitable centre for investigation. It would be impossible to model an English institute upon any given continental one; the organisation would have to grow from small beginnings along lines dictated by conditions in this country. Any institute would be an improvement on the present unsatisfactory procedure, which kept medico-legal experts out of touch with workers in other branches of medicine. It was, however, useless to consider the question until the financial problem had been solved, as, apart

from the cost of foundation, the expenses of the institute would have to be defrayed for the first few years. It would be impracticable to house the institute in any existing building, such as a discarded poor-law infirmary, for its work could only be carried out in a building specially designed for the purpose. Until the general public appreciated the necessity for an institute, or some serious disaster occurred, it was unlikely that any Government would take up the matter.

The CHAIRMAN inquired whether, in Dr. Temple Gray's opinion, the accused in France had such a fair chance of receiving justice—or of being acquitted—in France as in England. Reports of *crimes passionels* suggested that many persons were acquitted who would certainly be convicted in this country. He doubted whether teachers of forensic medicine in London could find the time to travel to a central institute.

Dr. TEMPLE GRAY, in his reply, stated that the French prisoner received equal justice with the English. Getting justice and being acquitted were not the same thing. French juries were very lenient, and their sentiment tended to balance any bias which the procedure might give to the prosecution. The jury might send for the President of the Court to inquire what effect their recommendation to mercy would have on the judgment. In addition to the official experts, it was the custom to nominate others of a lower standing to check their work. These, although not officially called by the prisoner, substantially assisted in his defence. The judge might ask an expert to attend and explain his report—rather an ominous invitation. Given the right teacher, a medico-legal institute could be started in a shed; the first toxicological bureau in Paris was housed under thoroughly insanitary conditions in the old Morgue. The future London medico-legal institute should start from the same small beginnings. The French were one of the most economical people in the world, and if they could afford an institute this country could, but the project would not be realised by the provision of a large sum of money. The first step towards a solution was to consider the manner in which the various institutes of the world had overcome their difficulties. It was essential that the medical profession be corporately represented on the managing board. Medico-legal experts in France were, on the whole, estimated by public opinion at their individual value. Dr. Temple Gray ended by pleading that, when the proposed institute was founded, the Medico-Legal Society should take a fitting part.

ROYAL SOCIETY OF MEDICINE.

SECTION OF UROLOGY.

A MEETING of this Section on June 27th, with Mr. SWIFT JOLY in the chair, was devoted to cinematographic demonstrations of three operations—prostatectomy, litholapaxy, and urethrotomy—performed by Sir John Thomson-Walker. The last of these films was accompanied by a talking film, a clearly enunciated description being given as each step of the operation was undertaken. The meeting, a large one, showed high appreciation of the demonstration, and this was expressed in a few words by the PRESIDENT.—Mr. FRANK JEANS, Mr. F. E. FEILDEN, and Mr. F. M. LOUGHNANE commented on details, after which Sir JOHN THOMSON-WALKER expressed his thanks for the assistance he had received from Mr. C. P. G. Wakeley, to whom he was indebted for the idea, and from the staff of the Department of Urology, King's College Hospital. The spinal anæsthesia had been given by Mr. Cecil Hughes. He could not speak highly enough of the work of the Medical Department of the Kodak Company. They had provided conditions under which a student could sit and quietly watch operations much more easily than if he was present in a more or less crowded operating theatre. The sound reproduction was carried out by the His Master's Voice Company, and hearers would judge of its success; if there were faults, they were faults of the speaker, not of the reproducer. An important question was, what was the value of moving pictures from the educational standpoint? He thought the profession was on the threshold of a good deal of change in this respect. It was well known to be impossible to show every student every sort of case or every sort of operation, but this new method enabled him comfortably to see and study half a dozen in an afternoon. Thus, he was sure, the means at the disposal of the Universities and teaching hospitals would be supplemented—he did not say they would be entirely changed—by this combination of moving picture and sound reproduction.

Sir John Thomson-Walker was cordially thanked.

Reviews and Notices of Books.

BIBLIOTHECA OSLERIANA.

Collected, arranged, and annotated by Sir WILLIAM OSLER. London: Humphrey Milford, Oxford University Press. 1929. Pp. 786. 63*s*.

THIS is the catalogue of the books illustrating the history of medicine and science collected, arranged, and annotated by Sir William Osler, and bequeathed by him to McGill University, Montreal. It is a vast volume of 786 quarto pages and shows Osler's catholicity. In the bequest to McGill we see the design of the testator to make the library possess a definite educational purpose, and this it does and much more also with its assistance. The plan of the catalogue was foreshadowed in 1911 and the work occupied Osler's few leisure moments throughout the intervening period until his death in 1919. Its preparation helped in some measure to mitigate the anxiety which the war brought him, an anxiety so sadly justified in the event, and at the time of his death the general outline had been sketched. It has fallen to Mr. W. W. Francis, the librarian of the Osler Library, Mr. R. H. Hill of the Bodleian Library, and Mr. Archibald Mallock, librarian of the New York Academy of Medicine, to complete the task by issuing the catalogue, their work being made possible by the whole-hearted coöperation of Lady Osler, who regrettably did not see the work finished.

The object of the index as laid down by Osler was to enable the hard-pressed student to learn first the evolution of knowledge in any subject and, secondly, the life and work of the men who made the original contributions; the general idea thus was to present in a comparatively small number of works the essential literature centring about the men of the first rank, arranged in chronological order. The Bibliotheca Osleriana, comprising about 7600 bound volumes, is grouped into eight sections as follows: (1) Prima: the beginnings (early civilisations), the medicine of the Greeks and the Arabians, the science and medicine of the Middle Ages, and the science and medicine with its scientific foundations and alliances of the sixteenth century down to the present day. (2) Secunda: the works of men which have some special interest but which are not so important as those in the Prima. (3) Lit teraria: books dealing with the literary vocations and hobbies of medical men, with the relations of medicine and science to the world of letters, medical and philosophical poems, and "medicated" novels, or novels containing medical characters. (4) Historica and (5) Biographica: general histories of medicine and the stories of special medical

movements or institutions. (6) Bibliographica: includes a vast collection of important catalogues. (7) Incunabula: a collection of more than 100 works printed before 1500. (8) Manuscripts: a collection in many languages comprising nearly 300 specimens, and including some of the collector's own writings.

It will be gathered that we have here a work of reference of the highest value both to individual students with many different wants, to those who want to correct or revise or criticise, and to all librarians. The advantage of sectional arrangement for reference is made available by a full and careful index of some 80 pages. It is unfortunate that the introductions which Osler intended to write as headings to the sections were never written, for his explanation to students how the Bibliotheca Osleriana was to be used would assuredly have made delightful reading. How to obtain and to pursue a knowledge of the history of science and of medicine would have been the very theme for his bright, learned, and logical pen, while the essays would certainly have constituted a wonderful commentary upon his own life—the life of the untiring and loving student.

While the library here catalogued constitutes the bulk of the literature brought together by Osler with a definite educational purpose, his bequests to the Medical Faculty of McGill did not exhaust his collection, for to Johns Hopkins University in Baltimore he left a collection of works, chiefly modern, on the arteries, blood, and tuberculosis, while to the Tudor and Stuart Club, at the same University, he left a collection of important editions of English works in memory of his only son Edward Revere Osler, who was killed in the war.

RECENT ADVANCES IN OPHTHALMOLOGY.

Second edition. By W. STEWART DUKE-ELDER, F.R.C.S., Assistant Ophthalmic Surgeon, St. George's Hospital. London: J. and A. Churchill. 1929. With 4 coloured plates and 110 text figures. Pp. 405. 12*s.* 6*d.*

A SECOND edition of this work has been called for within 18 months of its original publication. The author has taken the opportunity to add new matter based on as many as 370 additional references and has still managed to keep the volume to a reasonable size. The new work on the eye here described can only be followed by those medical men whose knowledge is based on a fairly broad scientific foundation. In the first chapter the accounts of the structure of the atom and the nature of radiation take the reader at once into deep waters; in the last, a discussion of those aspects of Pavlov's experimental work which tend to prove that all cerebral action is reflex leaves him in a whirlpool. The new work detailed in the intermediate chapters is for the most part easier to grasp. The "chronaxie" of the retina—that is, its sensitiveness to electric stimulation of a certain duration—has been found to differ in different parts, the required duration being greater in the periphery than in the foveal region; this result is not surprising in view of the distribution of the rods and cones. In the chapter on embryology the important additions to our knowledge arising from the recent work of Miss Ida Mann have been incorporated.

From the clinical standpoint the chief interest of the book is found in Chapters IV., V., and VI. Chapter IV. is devoted to the newer methods of diagnosis—the slit lamp, ophthalmoscopy with red free light, and the examination of the angle of the anterior chamber by the gonioscope, and Chapter V. with the vascular circulation, the nature of the intra-ocular fluids, and the intra-ocular pressure. Much attention is devoted to the origin and nature of the vitreous. Its chemical composition is practically identical with that of the aqueous, with the addition of two constituents which, absorbing water and swelling up in solution, give rise to increased viscosity, elasticity, and a certain amount of solidity. A substance in this state is called by physicists a "gell"; it is structureless except to the ultramicroscope. In Chapter VI. the three diseases discussed are retinitis, glaucoma, and cataract. The problems connected with glaucoma do not appear to have advanced much nearer to a final solution. Mr. Duke-Elder appears to regard it as a disease in which increase of intra-ocular pressure is not necessarily the essential symptom. He says on p. 206:—

> "A series of cases like those reported by Pickard (1925), wherein a cupping of the disc resembling cavernous optic atrophy was accompanied by symptoms akin to glaucoma without detectable rise in the intra-ocular pressure, is difficult to explain on orthodox lines. Experimental evidence also seems to suggest that the formation and development of scotomata are not entirely dependent on pressure, but in some cases, at least, are due to changes in the fluid traffic of the retina; and clinically the progress of the symptoms does not run by any means parallel with the tension and frequently continues after its efficient relief."

This is hard doctrine for those who look upon glaucoma and raised intra-ocular tension as synonymous terms. We do not get much practical guidance with regard to non-operative methods of treating glaucoma. The action of adrenalin on the eye is to cause contraction of the arterioles, but to render the capillaries more permeable. An initial lowering of tension is followed by a slight rise. Hamburger's glaucosan, which tends to lower the tension but dilates the pupil, is only suitable for secondary glaucoma. In clinical work we have little justification for experimenting, since Mr. Duke-Elder finds both glaucosan and histamine unreliable drugs. The new method of intravenous injection of salt solution is mentioned, but only as a measure preliminary to operation. A chapter on general methods of treatment sets out the views of the author, founded on his own work at the Moorfields light clinic. In the final chapter on neurology, new matter concerning the pupillary paths and the oculo-motor system will be found. To the index of subjects an index of authors has now been added.

The activities of ophthalmologists seem to be extending rapidly just now, and Mr. Duke-Elder is keeping pace with them with great skill and judgment.

ELECTROTHERAPY.

The Principles of Electrotherapy and their Practical Application. Second edition. By W. J. TURRELL, M.A., D.M., B.Ch. Oxf., D.M.R.E. Cantab., Consulting Physician, Oxford County and City Mental Hospital; Physician in charge of the Physiotherapy Department, Radcliffe Infirmary, Oxford. London: Humphrey Milford, Oxford University Press. 1929. Pp. 413. 16*s.*

Dr. Turrell's book is based upon a large practical experience of the diseases and complaints which can be cured or alleviated by electrotherapy. It is divided into six parts. An interesting historical chapter is followed by one on the therapeutic action of current electricity. The chief forms of the electrical current used in medicine are here outlined. A nice discrimination is shown by the author in describing the responses of the individual to currents of high and of low frequency, and of the currents which can be derived from the static machine. The therapeutic action of radiant energy is then considered; Dr. Turrell himself makes great use of the tungsten arc in hospital practice. Electrical Accidents and Electro-Diagnosis are discussed, and finally the application and mode of action of electricity in certain diseased conditions are outlined. This section takes up nearly 150 pages and should be of service to those who, having acquired some knowledge of the mode of action of the various currents, seek to apply them to patients.

Dr. Turrell has a long record of clinical experience, and has turned it to account in the application of electrical currents to damaged tissues or pathological conditions of widely different types.

UROLOGICAL ROENTGENOLOGY.

By HUGH H. YOUNG, M.D., Clinical Professor of Urology, Johns Hopkins University; Director, James Buchanan Blade Urological Institute; and CHAS. A. WATERS, Instructor in Clinical Roentgenology, Johns Hopkins University; Assistant Visiting Roentgenologist, Johns Hopkins Hospital. New York: Paul B. Hoeber. Pp. 499. $20.

THIS monograph is No. 7 of a series issued in America under the title of the Annals of Roentgenology. It is produced primarily for the use of radiologists though it contains material worthy of close study by urologists. Its main value lies in 518 figures, the majority being reproductions of actual radiograms of various conditions of urological interest. Taken for the most part from the service of the Blade Urological Institute and the Johns Hopkins University, these reflect the magnitude of the clinical area served by this institute and the ability of its director to make full use of the copious material. The radiograms—many of which are pyelograms, cystograms, and vesiculograms—cover every imaginable urinary condition and form a valuable collection for reference. Case-histories give a clue to the interpretation of the figures, though special points illustrated by individual radiograms should in some places have been more precisely indicated. Where radiograms are not supplied the text, which except in the first chapter is slender, is elucidated by beautiful drawings by Mr. Wm. P. Didusch. This first chapter, entitled Combined Roentgenological and Urological Study, is rigidly confined to the discussion of these aspects of technique which are common ground to both specialties—opaque media, the position of the patient for pyelography, perirenal insufflation, and so forth. Elsewhere the text consists of urological smatterings which are not sufficiently recondite to be valuable to the urologist and are of questionable importance from the radiologist's point of view. The authors have supplied them deliberately, however, holding that an intimate knowledge of the problem at issue on the part of the radiologist is essential to the success of the combined effort to solve it.

The book is beautifully though expensively produced. It represents faithfully the present stage in development of a youthful subject whose growth has been rapid and promises to continue so. The object of Dr. J. T. Case, the editor of the series, to supply a diagnostic guide rich in the fruit of experience of leading authorities in special fields has certainly been achieved in this volume.

PHYSICAL DIAGNOSIS.

Second edition. By CHARLES PHILLIPS EMERSON, A.B., M.D., Professor of Medicine, Indiana University School of Medicine. London: J. B. Lippincott Company. 1929. Pp. 553. 35*s*.

THIS book has been written because of the author's belief in the profound importance in medicine of the examination of the patient's body through the use of the unaided special senses, and his conviction that this will remain the primary and fundamental method of diagnosis. It is a rare change to have before us a book on diagnosis in which the use of microscopes or test-tubes is neither mentioned nor inferred. In the elucidation of disease, however, there can be no real subdivision, and a book rigidly confined to physical diagnosis is necessarily incomplete. In a work of over 500 pages on diagnosis in medicine we have a right to expect some material help in connextion with all the common medical states, but are occasionally disappointed in this one. For example, a search through the book for information on pernicious anæmia reveals only three references to this malady—the condition of the tongue, the colour of the skin, and the occasional enlargement of the spleen—the description of the blood being outside the scope of the work. If we accept these limitations as imposed on the author by his title, we can enjoy the pleasant writing and excellent balance of the sections allotted to each disease. The first chapter opens with an interesting historical sketch of the great masters in medical diagnosis, while the second deals with general body characteristics, types and attitudes in disease. The pages devoted to the general body surface contains a comprehensive account of the various skin conditions. The physical signs of the chest are accurately described and assessed with the mature pen judgment of an expert. References to recent contributions to literature are almost entirely confined to American publications. The photographs, the work of the Indiana University Department of Illustrations, are worthy of high praise.

OUTLINES OF DENTAL SCIENCE.

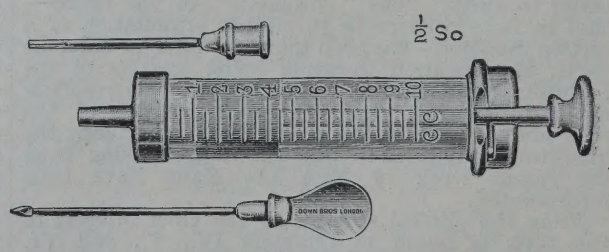
Dental Histology. By A. LIVINGSTON, M.D.S., M.B., Ch.B., L.D.S., Director of Dental Studies and Sub-Dean, King's College Hospital Dental School. Edinburgh: E. and S. Livingstone. 1929. Pp. 143. 7*s*. 6*d*.

THIS volume, which is one of a series of small books intended to cover the whole field of dentistry, is devoted to the histology of the dental tissues. It is clearly written and within the compass of 147 pages manages to convey a considerable amount of information. For revision purposes the student may find it useful, though used by itself it is scarcely full enough to satisfy examination requirements. The last chapter is devoted to microscopical methods and might with advantage have been more detailed. Should further editions be called for we would suggest that the meagre chapters on the structure of the tongue, oral mucosa, salivary and lymphatic glands might well be deleted and replaced by a more comprehensive description of histological methods with some account of the optical principles of the microscope. The illustrations are not numerous enough to be of real use.

New Inventions.

AN IMPROVED TROCAR AND CANNULA.

IN the aspiration of small abscesses, particularly in children, it is important to be able to carry this out as expeditiously as possible and with the minimum amount of inconvenience to the patient. The following are the outstanding points in the trocar and cannula here illustrated. (1) Comparatively short distance



between point of trocar and end of cannula. (2) Close-fitting of end of cannula to trocar, which is narrowed for the purpose, thus enabling the cannula to slip easily into the opening made in the skin. (3) Convenient length and bore of cannula. The trocar is 2 in. long, No. 6 French catheter gauge, and is used with a 10 c.cm. metal and glass syringe.

The apparatus has been made for me by Messrs. Down Bros., Ltd., St. Thomas's-street, London, S.E.

GEORGE JESSEL, M.D. Oxf., D.P.H. Manch.

THE LANCET.

LONDON: SATURDAY, JULY 6, 1929.

PROBLEMS OF EPILEPSY.

THERE are at least two recognisable types of unsolved problem, the simple and the complex. In a simple, which is not synonymous with an easy, problem the task before the investigator is a well-defined one, for example the extraction of the active principle of a gland or the isolation of the infective agent responsible for a disease. The discoveries that rewarded the patience of EHRLICH, ROSS, and BANTING were solutions of such well-defined problems. On the other hand, there are diseases which at present defy explanation by their very complexity, and the two outstanding examples of these are cancer and epilepsy. The investigator of these baffling problems has no determined starting-point. Like a wanderer in a maze he is compelled to take one turning after another, following the path to which personal predilection invites him without any guarantee that it leads in the right direction, or even that it is not a blind alley. It is characteristic of our state of ignorance that the very use of the term "epilepsy" should be of problematic value. Many writers refuse to employ it except for a symptom evoked by a number of pathological states, and they speak therefore of the "epilepsies."

Good will come from an emphasis upon the variety of lesions of which a convulsion may be evidence. But the existence of comparatively gross causes for epilepsy in some cases does not justify the assumption that such are its only causes. Actually there is evidence for the existence of a constitutional ætiological factor even sometimes when a focal lesion is also present. The oft-quoted incidence of epilepsy in about 5 per cent. of cases of gunshot wound of the head in the late war, and the constancy of this rate in all combatant countries, appear to point to a predisposition to convulsions latent in these individuals; there seems no other adequate explanation for the fact that a family history of epilepsy is obtainable from some 30 per cent. of epileptics and is not uncommonly present in patients with an organic "cause" for their convulsions, such as a head injury. If a "constitutional" basis exists in at least a proportion of epileptics it is natural to inquire whether the epileptic habitus is one of its manifestations. The practitioner with experience of epileptics soon learns to recognise that they often exhibit a characteristic facies, apart, of course, from such accidents as scars and a bromide rash. So typical is the appearance of many epileptics that it is often possible to make a correct diagnosis at sight before the history has been given. We have at present no means of deciding whether the epileptic facies is the result of the fits or the expression of an underlying diathesis. Equally uncertain is the relationship between mental deterioration and epilepsy. It was at one time believed that the mental degeneration of the epileptic was largely, if not entirely, the result of the large quantities of sedative and depressant drugs which fell to his lot. This is almost certainly untrue, for the mental condition of most epileptics is improved by anti-convulsant drugs, and it is a striking fact that they do not as a rule experience the depressant effects of bromide and luminal to the same extent as normal persons. Sedatives appear to fulfil a physiological need in epileptics. It does not seem, however, that any direct relationship exists between convulsions and mental deterioration, for every clinician is familiar with epileptics who deteriorate little if at all in spite of frequent fits, while others, perhaps less frequently and less severely convulsed, nevertheless become progressively demented. Is the mental deterioration of the epileptic possibly also an expression of a constitutional defect, of which degeneracy and convulsions are independently variable manifestations?

The conception of an epileptic diathesis involves the view that there exist potential epileptics who lack the precipitating factor, the trigger which fires the charge. Such must have been the previous condition, on this hypothesis, of the 5 per cent. of wounded who only became epileptic following their injuries. The hypothesis of a constitutional abnormality underlying some forms of epilepsy is the incentive, implicit if not explicit, of most metabolic investigations into epilepsy. If epileptics possess no common metabolic abnormality such researches are doomed from the outset to disappointment. Such has indeed been the outcome of many painstaking labours in the past. A long list might be made of metabolic functions in epileptics which have been conclusively shown to be normal. Even reported abnormalities have hitherto found no general acceptance. Other observers have failed to confirm the alkalosis reported by BIGWOOD, or the "ammonia dysregulation" upon which BISGAARD and NORVIG lay stress. It is, however, possible that a new and interesting chapter has been opened by the recent researches into the behaviour of the blood cholesterol in epilepsy. DE CRINIS and PEZZALI first observed abnormalities in the blood cholesterol level in epileptics, and POPÉA and VICOL drew attention to the association of a low blood cholesterol and disappearance of the lipoid of the suprarenal cortex in status epilepticus. ROBINSON, BRAIN, and KAY reported in our own columns[1] that the average blood cholesterol was lower in epileptics than in controls, and described 11 series of determinations, 10 of which showed a fall in the blood cholesterol level preceding a fit. We publish this week a communication reporting a further investigation of this question by Dr. GOSDEN, Dr. TYLOR FOX, and Dr. RUSSELL BRAIN. Using the method of serial determinations of the blood cholesterol at frequent intervals, these workers have confirmed the observations of ROBINSON, BRAIN, and KAY and demonstrated not only a depression of the blood cholesterol level during status and serial epilepsy, but its instability in association with isolated fits, and in four further instances a fall preceding an attack. Dr. GOSDEN, Dr. FOX, and Dr. BRAIN do not commit themselves to any theoretical explanation of these phenomena and are careful not to attribute any causative relationships between disturbances in the blood cholesterol level and the occurrence of convulsions. We know so little at present concerning the metabolism of cholesterol that these observations cannot be said to throw any direct light upon the cause of epilepsy. They do, however, appear to indicate the existence of a metabolic abnormality in epileptics and to suggest lines of research.

A definite fact concerning cholesterol which has long been familiar is its intimate relationship with the liver. It is secreted in the bile, being presumably

[1] THE LANCET, 1927, ii., 325.

removed by the liver from the blood stream. These observations upon the blood cholesterol in epilepsy therefore assume an added significance in the light of the investigation of the lævulose tolerance test in epileptics reported by Dr. GOSDEN and Dr. TYLOR FOX in this journal last week. These workers have as yet only a small number of observations to record, but they are of unusual interest. In several severe cases of epilepsy the lævulose tolerance tests yielded results hitherto associated with extensive destructive lesions of the liver. Less severe cases showed an impairment of lævulose tolerance of less degree. It is to be hoped that further investigations will be made on these lines. It is common experience that considerable destruction of the liver may take place without any detectable abnormality in the lævulose tolerance test. The findings of Dr. GOSDEN and Dr. FOX point therefore to a functional liver deficiency of extreme severity occurring in epileptics, though there is nothing in their observations to indicate the physiological relationship of this disturbance to the attacks. A number of years ago MYERSON observed in a small series of autopsies upon epileptics that the weight of the liver was subnormal in a large proportion of cases. This observation has since been confirmed by THOM, and more recently by PATTERSON and WEINGROW. Here there are hints, both anatomical and physiological, that constitutional abnormalities may be present in epileptics, and there are sufficient indications to encourage energetic research into their hepatic functions. Those who regard epilepsy as merely a symptom must admit that if they are right there is little hope of alleviating the complaint on a large scale. Those who seek an epileptic diathesis may encourage themselves with the knowledge that, if such could be discovered, an important advance would have been made towards a cure.

It is one of the fascinations of epilepsy as a subject of research that it presents so many aspects which, though necessarily related, are nevertheless to a large extent capable of independent consideration. It is not improbable that a metabolic abnormality might be discovered and relieved in epilepsy without its convulsant effects being understood, a situation similar to that which has arisen in the treatment of pernicious anæmia. Hence there is unlimited scope for those whose interest leads them to seek the physiological nature of a convulsion or the precipitating factors which lead to the onset of a fit. The belief that cerebral vasoconstriction plays such a rôle has long been held, though perhaps never on grounds which could entirely withstand criticism. The relationship between the concomitant vasomotor changes and the attack well illustrates the complexity of the problems of epilepsy. Blanching of the cerebral cortex at the beginning of a fit has been observed on several occasions by surgeons, but at the time when stress was laid upon this observation it was not fully understood how profoundly the opening of the skull alters the normal conditions of cerebral circulation. Moreover, even if cerebral vasoconstriction does occur at the beginning of a fit, parallel to the generalised cutaneous pallor, this is far from a proof that it causes the attack. Such vasomotor changes may merely indicate the participation of the sympathetic nervous system in the neural discharge which constitutes the fit. However, even if the vasomotor origin of the convulsion should prove to be mistaken, it will have shown once again the value of error, for this theory has led to the illuminating researches of COBB and FORBES which have gone far to establish the existence of vasomotor nerves to the cerebral blood-vessels. Those who look elsewhere than in the circulatory system for the genesis of the fit will probably expect to find it in a disordered metabolic state of the cerebral neurones, which expresses itself in a tendency to an uncontrolled discharge of energy. Here we reach the obscure realms of excitation and inhibition which neurology is now only beginning to explore. Already, however, we can recognise possible relationships between sleep, trance, narcolepsy, catalepsy, and epilepsy. The long familiar influence of waking and sleeping upon epileptic fits has recently been analysed in this journal by Dr. MARY LANGDON-DOWN and Dr. BRAIN, who have demonstrated that some epileptics react to sleep in a manner diametrically opposite to others, and suggest that this difference may lie in their response to the inhibitory influence which in PAVLOV'S view is the essential nature of sleep. From such considerations, at present necessarily speculative, it is but a step to the excitations and inhibitions which find expression in thought, feeling, and action, the influence of which upon epileptics is as profound as any metabolic or physiological changes. When fear may precipitate a fit and interest or effort avert one it is clear that psychology may have light to throw upon the nature of epilepsy.

In conclusion two facts may justifiably be emphasised. There was never less cause for pessimism as to the outcome of research upon epilepsy. But there was never a subject of research which so much necessitated a broad outlook in its investigation, and the closest possible collaboration between the biochemist, the physiologist, and the clinician.

COSMETIC SURGERY.

AWHILE ago we published a lively account of the award of 200,000 francs damages against an eminent Paris surgeon in a French court of law.[1] A patient, contemplating matrimony, was concerned as to the lack of symmetry of her legs. She consulted a surgeon who consented to perform an operation, reducing the right leg; owing, however, to difficulties of circulation, gangrene supervened and amputation became necessary. This substantial award of damages being regarded as a serious threat to certain aspects of French surgery, Dr. DARTIGUES, a past president both of the Société des Chirurgiens de Paris and of the Société des Médecins de Paris, brought the matter before the General Council of the Association Générale des Médecins de France in a vigorous protest. From this address it seems that the judge took the view that this particular operation was not necessitated by therapeutic considerations, that French law is not prepared to recognise certain operations of a merely "facultative" nature, and that the patient was deemed to be so strongly obsessed by her physical deformity that she was incapable of forming an independent judgment, or giving a legal consent to the operation which was, in fact, performed.

Without more exact knowledge of the grounds of the judicial decision (which, moreover, may be subject to appeal), it is difficult to comment on it. In England it would presumably be a mere issue of negligence. Cosmetic surgery has not yet occupied our judges' time, though they are familiar with claims for damages when dermatitis is alleged to have supervened after the application of hair-dyes. A woman's desire to look her best, and the disadvantage which age or disfigurement impose upon her matrimonial chances, are matters of which English judges and juries would undoubtedly take notice. In breach

[1] THE LANCET, March 16th, p. 576.

of promise actions juries are invited to assess the damage caused to a woman through the default of a fiancé to whom she was engaged during several years of her most marriageable age. In cases arising out of traffic accidents, injuries such as facial scars would similarly be regarded as a particular reason for liberality of compensation, and, if some physical disability were caused which modern surgery could ameliorate or remove, the cost of such further operation would no doubt be put forward as special damage due to the original accident. The criminal aspects of cosmetic surgery are even more speculative. As the law recognises the profession of surgery, it must admit the right of the patient to consent to the infliction of any bodily injury in the nature of a surgical operation, though such consent does not discharge the surgeon from the usual duty to exercise due care. STEPHEN, in his Digest of the Criminal Law, says further, that everyone has a right to consent to the infliction upon himself of bodily harm not amounting to maiming. He goes on to say that no one has a right to consent to the infliction upon himself of death, or of an injury likely to cause death, or of bodily harm amounting to maiming, *for any purpose injurious to the public.* He explains that he inserts the italicised words because it would be absurd to say that, if a dentist pulls out a patient's front tooth on the ground that the tooth, though not diseased, is unsightly, the patient and the dentist both commit a misdemeanour. For a clearer view of the English law we must wait till some definite case of the kind comes before the courts.

Dr. DARTIGUES, in his address, asked what was the proper sphere of "plastic" and "æsthetic" surgery, the epithets being in his opinion synonymous. Nobody doubts the propriety of using surgery as a corrective of congenital malformation or variation from the normal human type. It is equally applicable to remedy injuries due to accident or, as the last fifteen years have shown, injuries due to war. Coming down to the removal of facial lines or wrinkles and similar supposed blemishes upon feminine beauty, Dr. DARTIGUES has no hesitation in offering the resources of surgery here also. Æsthetic surgery in his definition is the sum of all operations of a plastic character intended to remedy natural or acquired defects in the human morphology which prejudice the personal and social value of the individual. He would agree, no doubt, that it is for the surgeon and not the patient to decide upon the propriety of the operation. If the beauty parlour movement develops a type of unqualified practitioner who, for a large fee, will exploit some fashionable operation for the mere removal of fancied blemishes, the law could hardly ignore the adverse consequences of risks thus run. Not long ago Prof. ARCHIBALD YOUNG, writing in our columns on the injection treatment of varicose veins, stated that he had several times been asked by quite young girls to apply the treatment to some odd superficial vein which caused no trouble whatever. Operation for mere beautification may be among the things which are lawful and yet not necessarily among those which are expedient.

DIPHTHERIA PROPHYLACTIC.

SINCE active immunisation against diphtheria became an everyday practice much attention has been devoted by laboratory workers to the subject of the antigen. In America this was originally an underneutralised mixture of toxin-antitoxin which was later replaced by a mixture in which the slight excess of toxin was further reduced, and the latter until quite recently has been extensively employed throughout the United States. Certain objections have, however, been raised from time to time to toxin-antitoxin mixtures and in this country they were superseded several years ago by toxoid-antitoxin. Toxoid, described by G. RAMON in 1923 and named "anatoxine" by him, is a modification of diphtheria toxin brought about by the addition of formaldehyde and exposure to a temperature of 38° to 40° C. for from four to six weeks. The process deprives the toxin of its toxicity but leaves the preparation in possession of well-marked antigenic properties, and it is in general use in serum laboratories for the preparation of diphtheria antitoxin. In this country toxoid alone has never replaced toxoid-antitoxin for immunisation of humans, although the procedures involved in its manufacture in the laboratory are simpler. As well as being a very efficient immunising agent, it has the further advantage that, since it contains no antitoxin fraction, immunised individuals are not sensitised to horse serum, a factor of some importance in these days when serotherapy is so widely employed for various conditions. It has, however, been given an extensive trial in France and Canada and now[1] we are indebted to Drs. GEORGE and GLADYS DICK for information on the comparative values of the immunity induced by toxin-antitoxin mixture and toxoid.

Two groups of susceptible individuals each numbering 100, mostly student nurses, have been immunised with each type of prophylactic to the point of being Schick negative. In the toxin-antitoxin group a preliminary injection of 0·5 c.cm. followed by four injections of 1 c.cm. at weekly intervals was given, whilst an interval of three months or longer was allowed to elapse before the reapplication of the Schick test. The toxoid group received three doses of 0·5, 1·0, and 1·5 c.cm., a two weekly period intervening between the injections, and retests were made not sooner than six weeks after immunisation was completed. It was found that in the toxoid group 94 per cent. of the total number, and excluding children 93·3 per cent., gave a negative Schick test, whilst in the toxin-antitoxin group 82 per cent. became negative reactors. Thus it appears that toxoid is a better immunising agent than toxin-antitoxin. The incidence of reactions has been carefully noted in the toxoid group, when 31·9 per cent. showed small local reactions, 9 per cent. large local reactions, 28·5 per cent. slight general reactions, and 6·3 per cent. moderate to severe local reactions. These observations are of considerable value, for the reason that toxoid has made little headway in this country, in spite of the advantages noted above, is probably because one or two workers have reported severe reactions following its use. The suggestion has been made that the reactions are the result of sensitiveness to some product of bacterial metabolism in the antigen, whilst others are of the opinion that the sensitiveness is towards some protein constituent of the medium in which the organism was originally grown. The Drs. DICK show, by an analysis of the nine severe general reactions represented by the 6·3 per cent. mentioned above, that when the original Schick test was performed five were marked and one was a moderate pseudo-reactor, whilst two had previous attacks of diphtheria. Whatever the real explanation of these reactions, the practical point that emerges is that they can be avoided or mitigated by commencing the immunisation of pseudo-reactors or persons in whom diphtheria has formerly occurred with small doses such as 0·1 or 0·25 c.cm. In view of

[1] Jour. Amer. Med. Assoc., June 8th, 1929.

data such as this it seems unlikely that toxin-antitoxin mixtures will survive very long, and we believe their disappearance would be greeted with a certain sense of relief by most immunologists.

The only serious rival that toxoid and toxoid-antitoxin have in prophylaxis is the toxoid-antitoxin floccule with which preliminary work is being carried out in this country and which on the basis of animal experimentation promises well. The ideal prophylactic that the clinician hopes to see evolved is a substance that will produce a high degree of immunity without unpleasant effects in one injection, but at the moment this is not in sight. We think, however, that in the meantime some attention ought to be paid to the spacing of injections as an improvement in results can be obtained by allowing intervals of three or four weeks between injections instead of weekly periods as originally recommended. Apparently the important factor to secure is the basal immunity following the preliminary injections. Once that has been established the succeeding injections stimulate the rapid formation of antibody.

Annotations.

"Ne quid nimis."

THE CAMPAIGN AGAINST RHEUMATISM.

SOME further developments of the scheme for founding a National Association for Combating Rheumatism, which we welcomed last November, were confirmed at a meeting, reported in another column.. The Executive Committee, elected last year, consisted of Sir Thomas Horder, Sir William Willcox, Dr. Fortescue Fox, Dr. E. I. Spriggs, Dr. C. W. Buckley, Dr. Kerr Pringle, Dr. Vincent Coates, Dr. L. J. Llewellyn, Mr. W. A. Cochrane, Dr. G. C. Anderson, Mr. W. A. Appleton, Mr. Henry Lesser, Mr. C. G. Izard, Dr. J. Alison Glover, and Dr. M. B. Ray (hon. secretary). They were charged to draw up recommendations for the general policy of the Campaign and to draft a constitution, and their suggestions were accepted at the meeting last week. The general direction and management of the Campaign is to be undertaken by a Council to which more than 70 individuals, including representatives of the various bodies were immediately elected, subject to their consent to serve. The Council so constituted has the power of coöpting additional members and to appoint executive, finance, medical, industrial, and general purposes committees from among its members. It is doubtless advisable to build up a National Association on the broadest possible basis, since help is needed from all branches of the medical sciences, from industrial leaders and from responsible public workers in many spheres. Unfortunately an edifice erected on such a scale must be of slow growth and it is permissible to hope that the desire to include everybody concerned with rheumatism in any form will not be allowed to cumber the new movement with too many administrators. In a national crusade against rheumatism the first requisite is research into causation. There are many forms of treatment which are recognised as partially successful and many other forms which have adherents. Under the plethora of treatment first principles tend to become submerged; research can only be organised on lines clearly defined. There is at any rate no lack of material and we hope that clinicians all over the country will submit to a levy on their capital of experience and permit the Association to tabulate and define exactly what is already known in the matter of statistics, ætiology, pathology, and prognosis. After this has been done the Association will be able to announce the precise directions along which advance is to be attempted, and to allocate definite tasks to its divisions and branches. In research much more than enthusiastic service is needed. Every worker for the Association should be able to help in the assurance that his efforts are designed to enrich the Association and not encumber it.

The international character of the problem is thrown into prominence by a book which we have just received entitled "Rheumaprobleme."[1] This is a report of a meeting held last October at Aix-la-Chapelle (Aachen), corresponding to the Bath Conference on Rheumatic Diseases earlier in the year. The gathering was a medical conference on research into rheumatism and most of the leading physicians of the spas of the Rhineland attended. Twelve independent contributions by acknowledged leaders on the various aspects of rheumatism are here published. The subjects include myalgia, serological studies, pathological anatomy, and histology. A discussion by Dr. Walter Krebs on physical and drug therapy shows how little agreement has yet been reached on the relative value of different methods of treatment. The schemes for investigation advised by our new National Association will be eagerly awaited abroad as well as at home.

OPERATION FOR GOITRE.

Dr. F. H. Lahey[2] has recently published his deductions from the study of 6700 operations for goitre—a mass of clinical material so large that it cannot fail to interest those whose opinions are based on comparatively few cases. Dealing first with the incidence of malignancy in goitre, he emphasises the liability of discrete fœtal adenomata to malignant degeneration and recommends their early removal. The clinical criteria of malignancy are not yet clear, but he thinks that all tissues showing vessel ingrowth, as first described by Allen Graham,[3] must be regarded as potentially malignant. In a series of 1484 cases of adenomatous goitre, 6 per cent. gave this evidence of malignancy on microscopic examination. Tumours of the thyroid gland often alter the position of the trachea, and if this valuable sign is present a radiogram should always be taken to exclude or confirm the presence of intrathoracic goitre. In a series of 4000 toxic goitres, the value of preliminary treatment with iodine has been amply confirmed. Preliminary pole ligations were rendered unnecessary and the mortality of exophthalmic goitre was much reduced. Lugol's solution was employed with advantage, not only in exophthalmic goitre but also in toxic adenoma, although its effects were less in the latter condition. Lahey advocates early operation for toxic adenoma before intense toxicity has supervened. To get its maximal effect in these cases iodine should be given for the first time shortly before operation. Long-continued iodine medication is bad from the point of view of operation later, so that where possible the decision between surgery and medicine should be made early. Patients with increasing thyroid toxicity are always in danger of passing into a severe thyroid crisis and any coexisting infection such as acute tonsillitis or influenza makes this risk greater. Subtotal thyroidectomy in the thyro-cardiac subject with heart failure evidently gives very good results. Only three deaths occurred among 200 cases in which hyperthyroidism was associated with failure of compensation, and patients for whom operation seemed a hopeless risk withstood partial thyroidectomy and recovered in a remarkable way. Lahey, indeed, holds that operation can be done in almost every case in which failure of compensation is due to a superimposed hyperthyroidism. When hyperthyroidism complicates diabetes mellitus or pulmonary tuberculosis, subtotal thyroidectomy may be very useful in controlling the associated conditions and should be done early. After operation for hyperthyroidism patients should always have their

[1] Published at Leipzig by Georg Thieme. 1929. Pp. 181. M.12.
[2] New England Jour. Med., 1929, cc., 909.
[3] Surg., Gyn., and Obst., 1924, xxxix., 781.

basal metabolism estimated at intervals of three months over a period of a year.

The results in 1000 consecutive cases of exophthalmic goitre and 245 of toxic adenoma showed that the average basal metabolic rate was within the limits of normal after three months and remained so while they were under observation. Parathyroid tetany only occurred in three cases in the whole series of 6700. This is attributed partly to careful surgical technique and partly to the fact that at the time of removal all thyroid specimens were carefully examined for possible parathyroid bodies. If these bodies were found and the finding was confirmed microscopically they were at once grafted into the belly of the left sterno-mastoid muscle. That this technique produced a living graft was confirmed experimentally on dogs by R. B. Cattell and R. L. Mason. The series contains no case of permanent bilateral abductor paralysis of the vocal cords, though unilateral lesions were occasionally met with. Lahey recommends that examination for unilateral paralysis should always be done before operation, so that if it is present elaborate precautions can be taken not to injure the remaining nerve. In this way some of the rare but desperate cases of bilateral nerve injury may be avoided.

A QUESTIONAIRE ON INSULIN.

THE editor of the *Vie Médicale* has published in the issue of May 25th (p. 515) the answers of 11 professors and doctors to the following question: "What are the contra-indications, absolute and relative, to the use of insulin in proven cases of diabetes mellitus"? Opinion was unanimous that insulin was of great value; no one claimed that any preparation was effective when given by mouth, though one remarked that protein shock was of real assistance. The inconveniences mentioned as attending the use of insulin were chiefly the necessity of daily injections and the occasional lesions at the site of the puncture, which varied from a local swelling to a local fat atrophy. A minor trouble was the occurrence of hæmaturia, but this was regarded as rare, and even if it did occur was of no significance. The danger of giving insulin to patients with renal disease was stressed by a few, on account of the risk of hypoglycæmia making its appearance unexpectedly. The development of tuberculosis of the lung was mentioned as a complication, but on the other hand it was reported that patients with tubercle and diabetes made good recoveries. A review of the replies shows that the only point on which there is general agreement is the danger of hypoglycæmia in patients with cardiac complications; if the patient is already suffering from cardiac failure the œdema may be considerably increased. Hypoglycæmia was thought to increase the chance of an attack of angina pectoris, and might cause the onset of a paroxysm of auricular fibrillation; hence the need of avoiding hypoglycæmia, if possible, by stricter supervision in these cases.

EFFECTIVE THORACOPLASTY.

THE extent of collapse obtained by the operation of paravertebral extrapleural thoracoplasty is not constant, and sometimes its incompleteness interferes with successful arrest of the disease. The amount of rib resected is an important factor, as is also its removal right up to the transverse process. Yet these factors are not the only ones influencing collapse. The character of the lung, the presence of dense fibrosis, or of thick-walled cavities are equally important, and not infrequently, especially in the latter condition, a further operation such as apicolysis may be necessary. It is to overcome such difficulties that various alternatives have been tried. Gustave Piotet and Eugène Urech have recently described heir experience[1] with Roux's technique. In this operation the incision starts just below the spine of the scapula and is continued down to the tenth rib, along which it is carried. A subperiosteal resection of the eleventh to the fifth rib is made in the usual manner, some 15 to 24 centimetres of rib being removed. The upper four ribs are resected by an entirely different technique. They are denuded of periosteum and resected in order from below upwards, but access is obtained to each from below and from their deep aspect after stripping the parietal pleura and performing apicolysis. The authors' claim that the resulting collapse is more complete is supported by illustrative radiograms. The operation is done under local anæsthesia and preferably in one stage. If this is impracticable, the fourth to the eleventh ribs inclusive are resected at the first stage, and at the second, not less than 15 days later, access is obtained to the upper three ribs by an incision parallel with and through the fibres of the trapezius, or parallel to and below the clavicle. The two-stage operation differs very little therefore from the ordinary thoracoplasty, save in the method of access to the upper ribs. The authors recommend a preliminary phrenic evulsion. Their results with this operation were published two years ago.[2] Of 31 cases, 4 died shortly after the operation, 7 were lost sight of, and 18 had survived from 1 to 7 years. Of the latter, 2 were cured, 11 considerably improved, and 4 gained some benefit.

[1] Schweizerische Medizinische Wochenschrift, 1929,

AN INVESTIGATION OF PSYCHO-ANALYSIS.

THE Committee[3] appointed in 1926 by the Council of the British Medical Association to "investigate the subject of psycho-analysis" has produced a report[4] which is not the less interesting for being inconclusive on the main points at issue. "From the nature of the case," runs the final conclusion, "the Committee has had no opportunity of testing psycho-analysis as a therapeutic method. It is, therefore, not in a position to express any collective opinion either in favour of the practice or in opposition to it. The claims of its advocates and the criticisms of those who oppose it must, as in other disputed issues, be tested by time, by experience, and by discussion." Yet, though the "discussion" of the Committee has not enabled its members to make any general pronouncement on the subject, one point of great practical importance is decided. They agree that, though the word "psycho-analysis" is used in a "loose popular sense hardly capable of description or definition," in a strict sense it should only be used for the methods and theories of the Freudian school. "In any scientific enquiry into the matter," they say, "the claims of Freud and his followers to the use and definition of the term are just and must be respected." Consequently the serious discussion of psychotherapy is confined to the methods of Freud's school; those of the rival schools of Adler, Jung, Stekel, and others, are discussed in a short section on Other Analytical Methods, and the remarks of the Committee on Psycho-Analysis are not intended to apply to them.

This recognition—that the methods and theories of the Freudians have the exclusive right to the name "psycho-analysis"—is of more than verbal importance. For the report virtually concedes the claim of Freud and his followers, as represented by the International Psycho-Analytical Association, to be considered as a distinct and important school of psychotherapy and their right to be judged entirely independently of their rivals or imitators. Clearly the members of the Committee agree that, whether or not psycho-analytical theories and methods are valid, Freud's priority in the field and the authority and professional organisation of his school gives

[2] Rev. Méd. de la Suisse Romande, 1927, xlvii., 239.

[3] The Committee consisted of 19 members (of whom two retired and were replaced) with Dr. R. Langdon-Down (chairman), Dr. C. Worster-Drought (vice-chairman), and Dr. R. G. Gordon (hon. sec.).

[4] Brit. Med. Jour., June 29th, 1929; Suppl. pp. 262–70.

to psycho-analysis (in the strict sense) a weight to which no other system of mental analysis is prima facie entitled. Psycho-analysis, both as a theory of psychology and as a therapeutic technique (the word covers both senses), deserves to be treated with the greatest respect. And though the Committee are non-committal about the most important issues, they pronounce quite definitely on some of the criticisms to which psycho-analysis has been subjected. They reply to the suggestion that "psycho-analysis applied as medical treatment may cause insanity in the patient" with the categorical "No proof of this charge has been discovered by the Committee." They refute the suggestions that psycho-analysis ignores the relation of the body to the mind, that it is materialistic and that it is inordinately expensive. They are satisfied that it is impossible to make a verbal record of an actual psycho-analysis in order to present it to a sceptical public. On all these points the contentions of the psycho-analysts are upheld.

The summary of "modern psycho-analytical methods and teaching," which the Committee "has reason to believe" to be "correct as far as it goes," lays great stress on the resistances which prevent the emergence into consciousness of parts of the unconscious mind, and describes the aim of a psycho-analysis as the overcoming of these resistances. In the replies to criticisms of psycho-analysis, which replies (provided by the President of the British Psycho-Analytical Society) and criticisms the Committee "leaves to the judgment of the reader," the element of resistance in the attacks of critics is emphasised. Thus the Committee, while declining to commit itself upon the truth or value of Freudian psycho-analysis, may fairly be said both to treat it with respect and to recognise that the charge of emotional prejudice which psycho-analysts make against their critics may have some foundation.

NEOSALVARSAN AS A PULMONARY ANTISEPTIC.

INTEREST in chronic lung diseases and the applications of surgery to their treatment has been greatly stimulated by Dr. R. A. Young's masterly review of this subject in his Lumleian Lectures delivered in London in March of this year.[1] Of such conditions there are few that demand greater care and judgment on the part of the physician than that of empyema, particularly when streptococcal in origin, and of chronic bronchiectasis. In the former there is general agreement that too early operation may and in fact usually does lead to that troublesome condition, chronic empyema. This result of treatment by open operation has led many workers to treat such cases by continuous aspiration, with or without irrigation of the cavity with some form of antiseptic solution. That most usually employed has been Dakin's solution—neutral 0·5 per cent. solution of sodium hypochlorite—though others have also found their advocates. Recently Dr Hans Edel[2] has recorded a few cases which he has treated with intrapleural injection of neosalvarsan. His treatment has been to aspirate the pus through a needle of moderate size, using the same needle to inject at once a solution of neosalvarsan. Edel has found that the pleura is able to withstand large doses of this solution without undue reaction; thus his usual initial dose has been 0·45 g. dissolved in 10 c.cm. distilled water, which is gradually increased up to 0·6 g. according to the general reaction and the degree of refilling of the empyema. The surprising tolerance shown by the pleura to such high dosage suggests to Edel that considerable local thrombosis occurs round the site of the injection. It is, of course, well known that neosalvarsan even in far weaker solutions is a powerful antiseptic, especially against streptococci, and it is natural that the attempt should be made to utilise it at the site of infection instead of in the blood stream alone. Edel has gone further and has injected solutions of similar strength (from 0·15 to 0·6 g. dissolved in 10 c.cm. of water) into the bronchial tree in cases of bronchiectasis. His method has been similar to that used for the introduction of lipiodol into the lung, namely, cocainisation of the trachea and direct injection through a laryngeal catheter. In the few patients he has so far treated Edel reports considerable success, the total quantity of neosalvarsan used being in one case as much as 5·25 g. Another patient suffering from right-sided pulmonary gangrene and empyema received in all 0·9 g. into the pleura and 2·7 g. into the lung, a total of 3·6 g. The patient became afebrile two days after the first injection and in 12 days the empyema had disappeared, "cure" resulting in seven weeks, though the X ray still showed some thickening of the pleura. The local application of arsenical bactericides in pulmonary conditions is a method to be watched with interest, although clinicians may hesitate to copy the high dosage employed by Dr. Edel until further results have been reported.

[1] THE LANCET, 1929, i., 593, 697, and 805.

[2] Die Lokalbehandlung eitriger Lungenprozesse mit intrahorakalen Neosalvarsan-injektionen, Med. Klin., April 26th, 929.

LOSS OF APPETITE IN CHILDHOOD.

THE literature of anorexia in children is voluminous and the underlying causes sponsored by individual writers innumerable. Some fresh light has, however, been recently thrown on the subject by a stimulating article from the pen of Dr. Joseph Garland,[1] who attributes the trouble essentially to a failure of management in the earliest weeks of life and confirmed in childhood by improper training and discipline. Thus he suggests that the initial loss of weight that occurs before the establishment of complete lactation is in itself an advantage to the baby, as during these first few days the sensation of appetite has time to develop, a sensation that the baby is never likely to lose subsequently. Once breast feeding has been established a transient loss of appetite is a usual occurrence during acute febrile disturbances, and may in fact be interpreted as a protective mechanism since the gastro-intestinal tract, under the circumstances, is not commonly prepared for the reception and utilisation of food. It is frequently found that the mother's greatest source of anxiety during the illness of a child is the failure to take nutriment, and it may require considerable patience to explain the situation to her. In many cases it should be realised that the appetite difficulty is not a real one at all, but exists only in the fertile imagination of the over-anxious parent. This is often the case with infants at the breast who take their feeds so rapidly that the mother becomes obsessed with the idea that little or no milk has been taken; weighing the baby before and after feeds will generally banish this illusion. Sometimes an artificially fed infant will fail to finish its carefully calculated allowance but continues to gain at a satisfactory rate. This baby does not require as much food as another infant of the same age and weight. One of the greatest boons that could be granted mankind would be an appreciation of the fact that all human beings are individuals with varying digestive capacities with varying temperatures, levels of activity, and caloric requirements.

The period of starting new foods, which includes very definitely the weaning period, presents often the first great obstacle to the continuation of a normal appetite. Habits of feeding have become firmly fixed, and infants, like their elders, resent change. Where such difficulties arise it is absolutely essential to ensure firmness in management on the part of mother and nurse, even if this entails two or three days' misery for all concerned. The physical

[1] Garland, J.: New Eng. Jour. of Med., 1929, cc., 1135.

causes of anorexia, admittedly much less frequent than the psychic, are usually quite apparent in themselves, although frequently it is necessary to disabuse a parent or nurse of the idea that a physical cause exists where in reality a search reveals none, and where it is obvious that the true fault lies elsewhere. It should be mentioned that over-feeding with milk is a natural mistake which a zealous mother frequently makes without realising the fact that milk, particularly with a child over a year old, is a very filling and appetite-destroying food; in no case should a child be given more than a pint a day. The importance of fatigue upon appetite cannot be over-estimated, and is especially apparent as a result of the intense "urbanisation" to which the modern child is subjected. Even in play the possibility of fatigue is present and disaster frequently awaits the highly strung child, who forces himself to follow the leadership of older and stronger children. It can readily be seen how difficult it is to analyse the cause of anorexia in a given case, and how much reliance must be placed on a detailed history of the home life and surroundings. While the shortcomings and difficulties of the particular case are being poured out by the despairing parents, the child himself is delighting in the fact that he will not eat a morsel of vegetables and that only with the utmost coaxing can he be persuaded to take any milk pudding. What a little price, he may well feel, is the loss of a few meals for such a sense of importance? Many children will not eat because that is what is expected of them, but who can blame them when they hear their parents discussing their own food idiosyncrasies at every meal?

The clinical picture is known to all but the correct lines of treatment are difficult to carry out. Dr. Garland indicates some of them. A thorough explanation of the situation should be given to both parents in the absence of the child and they should be exhorted to ignore all symptoms and never discuss details of the patient's management in front of him. It should be almost unnecessary to remark that heaping a child's plate with all that he is supposed to eat for the entire meal is to discourage him from the start. In the same way the meal should be attractively served on a tray, which is removed without comment at the end of a specified time and under no circumstances should he be urged or bribed to eat. In many instances it will be advisable to separate the child entirely for a time from his home surroundings and place him among other children where he will have companionship and judicious management. The whole subject is admittedly difficult and indicates the necessity for adequate instruction of parents in mothercraft, so that the child's habits can be trained on correct lines from the beginning.

A MODEL MEDICAL MUSEUM.

THE museums of most of our medical schools contain magnificent accumulations of admirable preparations, But as instruments of education they suffer from three substantial defects: (1) the rare and curious is much too prominent; (2) their arrangement fosters the notion that pathology has to do with states rather than processes; (3) the labelling and accessory illustrations are wholly inadequate, chiefly, we fancy, because the things in bottles are primarily looked upon as the objects in guessing competitions in examinations. The ideal that the exhibits in a museum should be illustrations of a text-book of their subject and should be amply supplemented by reading matter, pictures, diagrams, and so forth, has for a long time guided the arrangement of zoological and antiquarian collections. Those who wish to see the same plan applied to medicine should visit the museum at 33, Gordon-street provided by the generosity of Mr. Wellcome and presided over by Dr. Daukes. If they have not been before, they will be surprised, and we believe delighted. In a well-illustrated volume[1] (which may be had gratis from the museum by those interested) Dr. Daukes has explained the theory and practice of what he has done in a very interesting and informative way. We hope he will gain many converts to his methods, and those who are not prepared to go with him all the way will find many useful hints about museum technique.

RADIUM TECHNIQUE.

A POST-GRADUATE course on radium therapy will be held at St. Bartholomew's Medical College, London, from Monday, Sept. 30th, to Thursday, Oct. 3rd. Entry to the course, which will be of an introductory character, is limited to about 30 men, those who are likely to work with radium being preferred. Lectures will be given on the physical properties of radium and radon by Prof. F.L. Hopwood, on the biological aspect of radium by Dr. R. G. Canti, on its surface application by Dr. N. S. Finzi, and on its use in combination with deep X rays by Dr. W. M. Levitt. The applications of radium to the treatment of special regions will be made by Sir Charles Gordon-Watson for the rectum, Prof. G. E. Gask for the tongue and mouth, Dr. Malcolm Donaldson for gynæcology, Mr. Douglas Harmer for the larynx and air passages, and Mr. Geoffrey Keynes for the breast. On each day there will be demonstrations in the out-patient department or in the wards, and on three of the days operations will be carried out by members of the staff, including, besides those already mentioned, Dr. J. D. Barris, Mr. F. A. Rose, and Mr. Bedford Russell. Application for admission to the course, which is something of a new departure, should be made to the Dean of the Medical College. The terms may be seen in our advertisement columns.

One important side of radium technique is dealt with in our own columns this week by Dr. Joseph Muir of New York, who has made the subject peculiarly his own, for it was he who originated the use of the screened radon seed in the treatment of malignant growths. That the method opens up a promising line of work was admitted by Prof. Gask when addressing the British Empire Cancer Campaign a year ago.[2] Surrender of the use of radon is by no means a foregone conclusion even should a largely enhanced quantity of radium become accessible for general use in the near future, for increasing stress is being laid on the unwisdom of allowing radium element to leave the centres where it can be jealously guarded. Dr. Muir has for long championed the use of the glass tube containing radium emanation encased in a layer of platinum 0·3 to 0·4 mm. thick; although somewhat larger than the gold seed in common use in America, it has the advantage of being watertight and smooth, while it can be removed as soon as the treatment is concluded by means of the threads which are left in position. The unscreened or bare tube Dr. Muir regards as standing condemned owing to the zone of necrosis which invariably forms around it. In the œsophagus the dangers of tissue necrosis are great enough even with the screened tube, and sloughing in this position means a fistula into lung or trachea with rapidly fatal results; but even in complete stricture Dr. Muir claims to have restored the lumen of the œsophagus and to have so far relieved the patient as to permit him to resume ordinary diet and habits. In the uterus when the cervical canal is completely blocked by malignant tissue, he regards it as possible for a skilful operator to implant such screened seeds in the highly friable tissues without inflicting further trauma, and in this way so to clean up the malignant area as to render possible the more usual application of radium.

[1] The Medical Museum. By S. H. Daukes, Director of the Wellcome Museum of Medical Science. London: Wellcome Foundation, 33, Gordon-street, W.C. 1929. With 44 figures. Pp. 172.

[2] THE LANCET, 1928, i., 844.

In prostatic cases the radon seed enables escape from the prolonged hospital stay which deters from other forms of treatment.

THE WELFARE OF THE DEAF.

ON Thursday next, July 11th, at 3.30 P.M., the National Institute of the Deaf will hold its fifth annual meeting at the Caxton Hall, Westminster, S.W., when Lord Charnwood, who will preside, will be supported by Sir Frank Benson, Mr. Somerville Hastings, M.P., and others who realise the importance to the community of promoting the interests of the deaf. There are some 40,000 persons in Great Britain who have been deaf from birth or very early life, and while it is incumbent upon the State to make proper provision for these unfortunate people who demand our utmost sympathy, the loss in personnel and money to the country from want of proper attention to this afflicted class is very great. The appointment by the Government of a Departmental Committee at an early date to investigate this question was advocated by the Duke of Montrose in vigorous terms at the last annual meeting of the Institute, while it is now 40 years since any Government Department has made inquiry along the needed lines. The industrial hardships caused by deafness and their grave social implications were emphasised at an important meeting of the Institute, which was held at the London Mansion House three years ago, when the Duchess of Atholl pleaded the cause of the deaf eloquently. Much has been done by the untiring efforts of the Institute, in spite of financial difficulty, but official help is needed for much remains to be done. The meeting at the Caxton Hall next Thursday will be open to the public, who are invited to lend their support.

MATERNITY AND CHILD WELFARE CONFERENCE.

WHAT bids fair to be a most successful meeting, promoted by the National Association for Prevention of Infant Mortality in conjunction with many other allied bodies, opened at Friends House, Euston-road, on Tuesday last. The Marchioness of Aberdeen and Temair, who presided at the inaugural session in the unavoidable absence of the Minister of Health (who is to deliver his Presidential address later in the week), referred to the world-wide interest now awakened in this subject and the recognised need for obtaining the full coöperation of the fathers in the movement. Lady Aberdeen laid great stress on the disastrous results to family life from the maternal morbidity and morbidity dating from childbirth, and also gave expression to the general rejoicing and relief at the recovery of H.M. The King from his recent illness. After wishing success to the deliberations of the delegates, who number nearly 1000 and include representatives of the overseas Dominions and more than 36 English-speaking countries, Lady Aberdeen presented the challenge shields and prizes to the successful competitors in the various competitions arranged under the auspices of the National Baby Week Council. The Imperial Challenge Shield, which was won last year by Benoni in the Transvaal, has been won for 1928–29 by Kalutara, Ceylon, and Dr. C. P. Williams, Medical Officer of Health for Ceylon, was in attendance to receive the Certificate of Merit on behalf of the Kalutara Baby Week Committee. The Maharaja of Burdwan presided in the afternoon, and the whole of the first day was devoted to the consideration of the welfare of the child between 1 and 5 years. The branches of the subject discussed included child guidance clinics, the State care of children, the prevention and cure of crippling, and the handicap of illegitimate children, whilst the psychological aspect of the problem was debated in the evening at the annual meeting of the Association of Infant Welfare and Maternity Centres. Among the other subjects for discussion at the conference are maternal morbidity, special V.D. clinics in connexion with maternity and child welfare held departments, and methods of preventing undue delay in the out-patient departments of hospitals.

THE Imperial Social Hygiene Congress will be held from July 8th to 12th at Livingstone Hall, Broadway, London, S.W. 1., Lord Linlithgow presiding. Invitations have been sent to the Governments, universities, and organisations concerned with social hygiene throughout the Empire, and 200 delegates are expected.

INDEX TO "THE LANCET," VOL. I., 1929.

THE Index and Title-page to Vol. I., 1929, which was completed with the issue of June 29th, is now in preparation. A copy will be sent gratis to subscribers on receipt of a post-card addressed to the Manager of THE LANCET, 1, Bedford-street, Strand, W.C. 2. Subscribers who have not already indicated their desire to receive Indexes regularly as published should do so now.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Capt. J. H. Fergusson to be Surg. Rear-Admiral.

The following appointments are notified: Surg. Lt.-Comdr. (D.) C. Williams to *Pembroke*. Surg. Lts. H. L. Duncan to *Carysfort*, T. A. Cochrane and J. Cassen to *Vivid*, W. P. E. McIntyre to *Effingham*, J. W. Nesbitt to *Cleopatra*, and E. B. Pollard to *Victory XI*.

ROYAL NAVAL VOLUNTEER RESERVE.

Surg. Sub.-Lt. D. M. Craig to be Surg. Lt.

Proby. Surg. Lt. A. H. Shelswell to be Surg. Lt.

The following appointments are notified: Surg. Lt.-Comdr. R. H. O. B. Robinson to *Victory*, for R.N. Hospital, Haslar. Surg. Lt. R. L. S. Stubbs to *Pembroke*, for R.N. Barracks.

ROYAL ARMY MEDICAL CORPS.

Capt. P. N. Creagh (late R.A.M.C., T.F.) to be Temp. Capt., and temporarily relinquishes the rank of Capt.

ARMY DENTAL CORPS.

Capt. A. F. Salsbury to be Maj.

TERRITORIAL ARMY.

Lt.-Col. H. F. Humphreys to be Bt. Col.

Maj. G. H. Stevenson (late R.A.M.C., Militia) to be Maj.

Capt. R. K. Nisbet relinquishes his commn.

Lt. D. C. Vaughan to be Capt.

Lt. E. S. Kirkhouse (late 3rd Bn. K.O.S.B.) to be Lt.

G. B. Matthews to be Lt.

Supernumerary for Service with O.T.C.—2nd Lt. G. B. Scholefield (late R.E.) to be Lt. supern. for serv. with Med. Unit, Univ. of Lond. Contgt., Sen. Div., O.T.C.

TERRITORIAL ARMY RESERVE OF OFFICERS.

Maj. C. B. Baxter, from Active List, to be Maj.

Lt. L. Gardiner (Army Dental Corps), from 6th Bn. E. Surrey R., to be Lt.

INDIAN MEDICAL SERVICE.

Capt. L. K. Ledger to be Maj.

Temp. Lt. Mir Saleem Mahmood relinquishes his temp. commn.

DEATHS IN THE SERVICES.

Lt.-Col. George Henderson, late I.M.S., who died at Inverness on June 23rd in his ninety-third year, was educated at Aberdeen University and graduated M.D. in 1858, obtaining the L.R.C.S.E. in the same year. In the following year he went to India and for some time served in the Indian Medical Department as civil assistant surgeon at Shahpur. In 1865–67 he became officiating professor of medicine and surgery at Lahore Medical College and afterwards superintendent of the Lahore Central Jail. Later he became officiating superintendent of the Botanical Gardens in Bengal and professor of botany in the University of Calcutta. Subsequently he was appointed civil surgeon at Gujranwala and also served at other stations in the Punjab. He retired in 1890. Lt.-Col. Henderson leaves a widow, two sons, and two daughters.

The Clinical Interpretation of Aids to Diagnosis.

A Series of Special Articles contributed by Invitation.

XXXVI. CHARTS OF FRACTIONAL TEST-MEALS.

PART I.*—NORMAL CURVES.

GASTRIC analysis is a less exact procedure than the majority of biochemical investigations, for not only do the stomach contents exhibit a greater normal variation in their chemical composition than do most substances recoverable from the body, but this variation is itself dependent on a series of factors which change in a given individual from hour to hour and from day to day.

The Variable Factors.

The more important of the variables concerned may be divided into : (*a*) extrinsic, and (*b*) intrinsic factors—and these may be further subdivided in the following manner :—

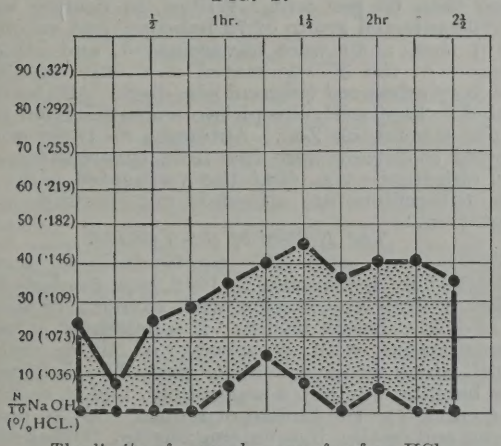
Extrinsic Factors.—(1) *The composition of the meal.* This will vary even when a fairly simple dietetic material, such as oatmeal gruel or toast and water, is selected in every case.

(2) *The Fasting Stomach Content.*—This varies considerably from case to case and even in the same individual from day to day.

Intrinsic Factors.—(1) The *stomach content* at any moment is a mixture of food, of secretion from the gastric glands, of secretion from the salivary glands, and of duodenal contents regurgitated through the pylorus. Not only do these factors vary from individual to individual, but in every individual there is some degree of daily personal variation.

(2) *Psychic factors* can be of great importance. Difficulties in swallowing the tube and apprehension after swallowing it will sometimes cause an inhibition of gastric secretion, and as the subject under investigation is almost invariably being examined for the

FIG. 1.



The limits of normal curves for free HCl.

first time, inhibition is a factor which must be taken into account.

(3) *Errors in Sampling.*—The stomach contents are never homogeneous. Those recovered from the pyloric antrum are usually more acid than those at the cardiac end, and in addition it is obvious that in an actively secreting stomach the contents close to the mucosa will be the first to receive secretion. Experience in the withdrawal of samples for gastric analysis overcomes grave error from this cause in most cases, but it is clear from the foregoing paragraphs that inexperience in the practical side of collecting samples for gastric analysis is a more important potential source of error than is the possibility of inexpert chemical analysis of the samples themselves.

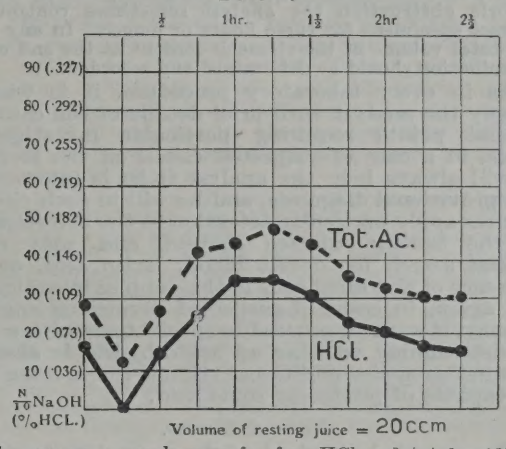
For these reasons, whenever an important decision rests on the interpretation of a fractional gastric analysis, the recovery of the samples should be confided to someone fully experienced in the procedure.

Collection of Samples.

If, however, the practitioner himself desires to collect the samples, it should be done according to the following technique, fuller details of which are available in current text-books.

The patient is allowed no food or drink after 9 o'clock on the night preceding the examination. At that hour it is well to give some charcoal biscuits or a glass of milk containing powdered charcoal, in order to provide a substance readily recognisable if a high degree of pyloric stenosis is present. On the morning of the examination, about 9 o'clock the patient swallows the tube and by means of a 20 c.cm. "Record" syringe the whole of the fasting stomach content is withdrawn, measured, and carefully preserved. If the total bulk is less than 10 c.cm., it is probable that the stomach had not been completely evacuated, and it is sometimes well to introduce one or two syringes full of warm water to assist in recovering the residual contents. In such cases it must, of course, be noted that the fluid withdrawn has been diluted by the water added.

FIG. 2.



The average normal curve for free HCl and total acidity.

The stomach being empty, the patient, with the tube in position, is given a pint of gruel made by boiling two tablespoonfuls of fine breakfast oatmeal in a quart of water until the total bulk has been reduced to one pint. The mixture is then strained and flavoured with salt, unless chloride estimations are to be made.

It is at that stage of the examination that the patient is most likely to experience discomfort or nausea, and, therefore, a light magazine or daily newspaper should be provided and the patient encouraged to read very attentively for at least ten minutes. At quarter-hourly intervals, after swallowing the meal, samples of 5–10 c.cm. are withdrawn by the syringe and preserved in test-tubes, labelled one-quarter, one-half, &c. Care should be taken to ensure that these samples are recovered from the stomach contents and not from the duodenum or some isolated loculus. This can be accomplished by noting that the tube is at the right depth and occasionally withdrawing it one or two inches, or getting the patient to swallow it deeper if its position has materially changed.

If the stomach appears to empty with undue rapidity, the tube should be moved about and aspiration attempted in different positions before it is assumed that the contents have all passed on. At the end of 2½ hours it is usual to empty the stomach completely and to make a note of the volume of the contents, a 10 c.cm. sample of which is preserved for analysis. The samples thus collected, together with

* Part II., on the interpretation of charts in patients showing high acidity, low acidity, and of charts suggestive of gastric carcinoma will follow next week.

notes concerning the patient and the total volume of the fasting content and the final residuum, may be forwarded to a laboratory for analysis and will not undergo material chemical change during a period of fully 12 hours.

Details of the Report.

A report of a fractional gastric analysis should supply information on the following points:—

(*a*) The volume and character of the fasting stomach content.

(*b*) The character of the samples recovered at intervals after the taking of the test-meal.

(*c*) The volume and character of the total stomach content at a sufficiently long time after the taking of the meal for it to be reasonably expected that the stomach will be nearly empty. Two and a half hours is usually the longest time over which the examination is continued, but in cases of pyloric obstruction the analyst sometimes continues to extract specimens for three hours or longer. In any case, the total volume of the stomach content at the end of the examination should be determined and recorded.

As in every laboratory procedure, it is wise to supply the analyst with brief details of the case and special points requiring particular investigation. Thus, in a case of suspected cancer of the stomach it will always help the analyst if he is informed of the provisional diagnosis, and he will in such circumstances apply particular attention to the investigation of the fasting stomach content and may make special search for occult blood, lactic acid, or the presence of abnormal cells in the samples investigated. Or, again, in cases of suspected pernicious anæmia, he may, if warned, proceed to special tests with a view to determining whether an achlorhydria is absolute or whether under additional stimuli the mucosa may be capable of producing some acid.

Normal Curves.

The accepted standard of the normal in fractional gastric analysis is derived from the series of 100 healthy medical students examined by J. A. Ryle and T. I. Bennett, who showed that in 80 per cent. of such subjects the fasting stomach content did not exceed 100 c.cm. and might be almost completely absent; also, that the free HCl fell practically to nil immediately after taking the meal, and subsequently rose to a height somewhere below 50 N/10, falling away from this point during the later time of the investigation. Fig. 1 shows a shaded area within which fall all the readings for free HCl in any of these 80 per cent. of normal subjects, and a curve which conforms roughly to this shaded area must at once be accepted as not differing materially from the normal average.

The Curve of Total Acidity.—This in normal subjects is closely parallel to the curve of free HCl and stands at 10–20 c.cm. higher than the former curve. The two curves are never exactly parallel owing to factors such as regurgitation from the duodenum occasionally diminishing the free HCl without so greatly affecting the total acidity.

It will be observed that the curves, both of free and total acidity, tend to rise during the first hour and to fall subsequently. The shape of the average normal curve calculated from a large series would, therefore, be somewhat as shown in Fig. 2, but the relatively wide shaded area in Fig. 1 makes it clear that a considerable departure from the *average* may occur without anything approaching abnormality being present.

Exceptional "Normal" Curves.

In our study of healthy subjects we observed that extreme deviations from the normal might occur in an important percentage of cases. Thus about 5 per cent. showed a complete absence of HCl with a low total acidity, and about an equal number showed a very abundant secretion with a high concentration of HCl. Although such pictures are most frequently encountered in pathological conditions and will be referred to again in later paragraphs, it must never be forgotten that they may occur in normal men.

T. IZOD BENNETT, M.D., F.R.C.P.,
Physician to Out-patients, Middlesex Hospital.

Special Articles.

TUBERCULOSIS ASSOCIATION.

ANNUAL PROVINCIAL MEETING, CAMBRIDGE, JUNE 27TH–29TH.

THE meeting which was held in the Medical School at Cambridge from Thursday, June 27th, to Saturday, the 29th, was divided into four sessions.

I. THE PREVENTION AND HEALING OF TUBERCULOSIS BY TURTLE-VACCINE THERAPY,

Dr. ERNEST WARD (Paignton) being in the chair,

Dr. FRANZ NAGELSCHMIDT (Berlin) said that if the turtle-vaccine therapy had been used systematically from the time of its discovery by Friedmann, much of the expenditure on the campaign against tuberculosis, which had had relatively meagre results, could have been avoided. For various reasons the method had fallen into early disrepute, but in various countries about three million cases had now been treated by it, and protective inoculation had been extensively carried out, so that we were now in a position to review the results and revise any hasty judgments. The main stated objections to turtle-vaccine therapy were that it was too dangerous, that it was too harmless, that the tuberculous lesions would have healed just as well without the vaccine, and, finally, that many of the cases so treated were not tuberculous. Since 1922, the opponents of the vaccine had ceased to say that it was dangerous or that the bacilli might become virulent; on the other hand, it was evidently not inert, as witness the report of the American Board of Health, and the experimental results of guinea-pig immunisation against tuberculosis by Aronson in 1914, and by Rabinovitch, Klebs, Klemperer, and Reichenbach. It would be difficult to refute the objection that the cases would have healed just as well without vaccination, but Szalai, in Hungary, had inoculated with turtle-vaccine more than 15,000 patients in the last few years, and had lowered the death-rate from tuberculosis by more than 60 per cent. Willies, in dealing with a heavily infected group of 75 baboons, had vaccinated 35 of them; 40 were unvaccinated, and all died; whereas of the 35 vaccinated ones only one, which had very advanced tuberculosis, died. All the others healed or kept well, except two which fell from a rock in the Hagenbeck Zoo. Autopsies on these animals showed that they were free from tuberculosis. The last objection—viz., that the vaccinated cases were not tuberculous at all—did not require serious refutation.

The Nature of the Vaccine.

Vaccination with the turtle tubercle bacillus, published by Friedmann in 1912, was fundamentally different from vaccination with extracts of bacteria or of dead tubercle bacilli. It represented an active immunisation with a species of living tubercle bacilli which was avirulent for warm-blooded animals. The bacillus was not a saprophyte, and it could live long enough in the human or animal body to produce strong and lasting immunising effects. Other species of tubercle bacilli were of no use for this purpose. The living tubercle bacillus of human and bovine origin must be rejected because, even in a weakened form, it could become virulent by injection into the human or animal body. Up to the present time only the turtle tubercle stock grown in 1903 from the tuberculous lungs of a sea-turtle with spontaneously acquired tuberculosis answered all the demands that a tubercle vaccine suitable for men and other warm-blooded animals should fulfil. The turtle tubercle bacillus was non-pathogenic in the bodies of warm-blooded animals; the optimum temperature for its culture was 98·6° F., and it could be kept alive or active in the human or animal body for many months or years. The turtle bacillus stock had not changed biologically since its original culture. The characteristics of growth on artificial media, its ability

to create immunity against tuberculosis of bovine or human character in warm-blooded animals, and to heal non-advanced tuberculosis had not been changed. So that it was a real "virus fixe." Even though the turtle vaccine was not able to produce a tuberculosis of the human or bovine type, it could produce an immunity to both types. This was shown by the fact that individuals giving a negative reaction to tuberculin generally reacted positively to prophylactic or curative turtle vaccination.

In regard to the prophylactic power of the turtle vaccine, Dr. Nagelschmidt cited the case of two parents with open tuberculosis who had five children, the first and last of whom were vaccinated. The intermediate three children all died of tuberculous meningitis. In all the later literature no case showing harmful results following vaccination had been published.

Technique.

In order to get the best results with the vaccine, said Dr. Nagelschmidt, it was important to follow Friedmann's directions exactly. Patients with tuberculous cachexia, with multiple tuberculous foci, generalised tuberculosis and meningitis, &c., were unsuitable for such treatment. Children with tuberculous lesions, on the other hand, showed striking improvement, as, for example, in fistulæ, and in bone, joint, and gland tuberculosis.

The vaccine was prepared under the supervision of Prof. Kruss, Director of the Leipzig University Institute of Hygiene. It was made in three strengths, varying in the number of bacilli to the ampoule, the grades being labelled "very weak," "weak," and "strong." The contents of each ampoule were about 0·5 to 0·7 c.cm. The injections were made subcutaneously, the site of election being 2–3 inches behind the greater trochanter. Intravenous injection was made only in special cases; as for example, in early and encapsulated tuberculosis of joints; recent and closed spondylitis without abscess formation; Poncet's tuberculous rheumatism of joints; recent tuberculous iritis, choroiditis, uveitis, and episcleritis; early unilateral renal tuberculosis; tuberculous orchitis, and epididymitis, with or without fistulæ. The treatment advised in these cases was an intravenous injection of 0·1 to 0·5 c.cm. "weak," together with a subcutaneous injection of 0·1 to 0·5 "strong."

Prophylactic vaccination might be undertaken if possible immediately after birth. Infants should receive 0·5 c.cm. "weak." In somewhat older children with small tuberculous foci the dose should be 0·5 c.cm. "very weak." The protection thus set up lasted for 10 to 12 years, but might cease sooner in cases exposed to massive, virulent, or frequent infection. Intercurrent infections, such as influenza and whooping-cough, destroyed the immunity, and in such case revaccination should be carried out. Revaccination should also be done in the event of the development of a tuberculous focus.

In surgical tuberculosis, the only cases not suitable for treatment were those which had, or were suspected to have, closed and deep-seated abscesses. If, however, these abscesses were about to perforate or were near the skin surface, they could be opened surgically, allowed to form fistulæ, and six weeks later an injection of turtle vaccine could be given. An alternative method was to give an injection of vaccine at once, and the abscess allowed to perforate spontaneously. After vaccination cold abscesses flared up, perforated, and then healed.

A local tissue reaction at the site of injection was noticed in some cases consisting of small abscesses or the formation of granulation tissue containing giant cells and turtle tubercle bacilli. The appearance or non-appearance of a local tissue reaction was not always essential for a prognosis, but its character was often a useful guide in the further treatment of the case.

In pulmonary tuberculosis the more chronic and inactive the disease the smaller the dose given, the more active the disease the larger the dose.

Experiment on a Large Scale in Prophylaxis and Treatment.

Dr. Nagelschmidt then described an experiment conducted in Pest-erzsebet, a suburb of Budapest. It was, he said, a manufacturing town of about 60,000 inhabitants, with approximately 90 per cent. of workmen. The people were very poor, and the houses were mostly very miserable and very damp. Six to nine people often shared one room. Two to three slept in one bed, many on the floor. The town had no money to support people out of work, or to supply them with food and milk. The conditions were incredible in a civilised country.

A physician of the town, Dr. Eugen Szalai, heard of the turtle vaccine method, went to Berlin to study it, and then gave about 2000 vaccinations in 1922. Soon after this a period of famine, revolution, and inflation ensued, and his work was interrupted until July, 1925. At this time Dr. Szalai introduced compulsory notification of cases of tuberculosis, clinically diagnosed as well as open cases, and again instituted the turtle vaccine therapy and prophylaxis. No other method of treatment was used, and the results were striking.

In the whole of Hungary there were 52 towns with more than 10,000 inhabitants (in 1922 there were 49). These 52 cities had in 1923 an average mortality from tuberculosis of 33 in 10,000. Pest-erzsebet had 39 deaths per 10,000. In 1928 Pest-erzsebet had only 18 deaths as against 28·8 in Budapest, and an average of 26·4 in the 52 towns. In 1923 Pest-erzsebet held the thirty-seventh place among the 52 Hungarian towns and to-day it took the sixth place. Dr. Nagelschmidt was confident that at the end of the present year it would hold the first place. The physicians of Pest-erzsebet stated that cases of advanced tuberculosis were now rarely seen. This was the first experiment with turtle vaccine therapy on a large scale in one administrative area.

In the years 1925, 1926, and 1927 4812 cases of pulmonary tuberculosis in the first stage were treated. Of these 12 died, 9 became worse, and the remainder were cured. 216 cases in the third stage were vaccinated. Of these 67 died, 23 cases became progressively worse, and 109 resumed their work. 125 cases of the third stage were not treated with vaccine. Of these 115 were dead and 10 became worse; not a single case improved.

In conclusion, Dr. Nagelschmidt said that no untoward results had followed the vaccination; that in really early cases of tuberculosis the percentage of clinical healing reached 98 per cent.; that in tuberculosis of infants healing almost always occurred; and that turtle vaccination should be tried in almost all cases of surgical tuberculosis, for operative measures could often be avoided by its judicious use.

Discussion.

The CHAIRMAN said he would like to have heard more about Dr. Nagelschmidt's own cases, and also about the cases treated in this country. He remembered that about 1913 there were three vaccines of live avirulent tubercle bacilli in use—viz., those of Friedmann, Calmette, and Nathan Raw. In his opinion the results of treatment were not impressive. It was an unfortunate feature of all the "cures" for tuberculosis that they only gave good results in early cases. He asked Dr. Nagelschmidt how the vaccine was prepared, what was the correct method of dosage, and how many bacilli there were in each ampoule.

Dr. S. VERE PEARSON (Mundesley) asked how much publicity had been given to the method of preparation. As far as he recollected, the method of preparation of the Friedmann vaccine had not been published in full. He inquired why the turtle tubercle bacillus had been chosen for the vaccine in preference to avian and reptilian bacilli.

Dr. F. R. WALTERS (Farnham) expressed the view that it was a great drawback if a remedy was only available for early cases, and emphasised the tendency to spontaneous cure in tuberculosis. He looked forward to the publishing of further evidence.

Dr. W. H. DICKINSON (Newcastle-on-Tyne) felt that the results given by Dr. Nagelschmidt were almost too good to be true. He had seen ten cases

treated by the method, but the vaccine had been given only six weeks ago, and it was much too early to make any satisfactory deductions. He was satisfied, however, that the cases were improving.

Dr. A. DE W. SNOWDEN (New Forest) inquired whether early laryngeal tuberculosis was a contra-indication to the administration of the vaccine.

Dr. G. T. HEBERT (London) was impressed by the results of treated cases, but thought that the statistics needed very careful scrutiny. He was also impressed by the fact that only one dose of the vaccine was given, and the patient did the rest.

Dr. G. E. SOLTAU (Nayland) said that she had seen 14 cases treated, and that surgical cases had done very well. The pulmonary cases were no worse, and several were a good deal better. Some had developed small abscesses at the site of the inoculation.

Reply.

Dr. NAGELSCHMIDT said that it was impossible in a short paper to give detailed information. Each case needed individual treatment. One had to use great care in vaccinating cases of lupus. No hard-and-fast rule, however, could be laid down concerning dosage. He admitted the possibility of spontaneous cure, but maintained that it was not possible to tell beforehand which of the cases were going to heal. He did not know how the vaccine was prepared, nor did he particularly wish to know. He was content to leave that to the manufacturers. He did not know how it differed from the Friedmann vaccine. Tubercle bacilli from birds and reptiles had been tried without good results. They could not live long enough in the human blood to produce the desired effect. The Calmette preparation was, in his opinion, much too dangerous. Laryngeal tuberculosis was not in itself a contra-indication to the use of the turtle vaccine, but only because it was usually associated with very advanced cases of pulmonary tuberculosis. He advised his audience to treat early cases only. Advanced cases could only be dealt with successfully by physicians who had had great experience with the vaccine.

II. THE DIAGNOSIS OF INTRATHORACIC TUBERCULOSIS IN CHILDREN,

Dr. F. R. WALTERS (Crooksbury) being in the chair,

Dr. C. D. AGASSIZ (Highwood), in his opening paper, said that what one was taught and what one read about the diagnosis of intrathoracic tuberculosis in children gave a somewhat false picture of what was found in actual practice. He thought that a solid basis for diagnosis might be reached by studying three groups of cases—viz., (*a*) those in which tubercle bacilli had been found in the sputum; (*b*) those in which a diagnosis of pulmonary tuberculosis had been arrived at, without the presence of tubercle bacilli in the sputum or fæces; and (*c*) those in which the signs and symptoms were indefinite.

Group A consisted of 87 T.B.+ children (24 boys and 63 girls), 40 of whom (46 per cent.) had a history of direct contact with a case of tuberculosis. It was notable that only in one case had tuberculosis developed after an attack of infectious fever. In the majority (63) the onset was marked by cough, accompanied by wasting in 20 cases, pain in the chest in eight, lassitude in four, and anorexia or malaise in three. The first sign in three cases was hæmoptysis. In four cases there was a history of pneumonia or pleurisy followed by cough, and in three an attack of influenza. Somewhat to his surprise, night-sweats occurred in 27 cases, and dyspnœa, either at rest or after exercise, was observed in 33 cases. Physical examination showed that in practically all this group the signs were mainly or primarily apical—i.e., the clinical picture resembled that of pulmonary tuberculosis of the adult. From the literature one would gather that in children pulmonary tuberculosis of the adult type was very rare; yet here was a series of established cases in which the adult type was not the exception, but the rule.

It might be argued that these were cases of extensive disease, and that the adult type might reasonably be expected in them. He therefore analysed the 47 cases falling into *Group B*. Of these, 24 (51 per cent.) gave a history of direct contact with a case of tuberculosis. A history of cough was obtained in 31 cases, accompanied by wasting in ten, lassitude in five, pain in the chest in two, and anorexia in two. In one case the first sign was hæmoptysis, and in two the cough was accompanied by hæmoptysis. In five cases there was a preceding history of pneumonia or broncho-pneumonia, in two of influenza, and in only one did the symptoms date from an attack of measles. In ten cases night-sweats were present, and in ten dyspnœa was observed. In this series also the physical signs were mainly apical. This fact was even more evident than in the first group, because the disease was usually less extensive.

On turning to the less definite cases in *Group C*, in which the physical signs were slight, it was found that the evidence, although not so clear-cut as in the first two groups, was still similar. Of the 16 cases, seven gave a history of contact with a case of tuberculosis. There was history of cough in eight cases, lassitude in one, pain in the chest in two, loss of weight in three, night-sweats in eight, and dyspnœa in three. In only one case was there a history of the disease following an attack of measles, and in one it followed an attack of mumps. Here again the physical signs, although usually slight, were confined to the apex. In Dr. Agassiz's opinion it was inadvisable to rely on the report of the pure radiologist in these cases. The points in radiograms to which he paid particular attention were lack of translucency at the apex; increase of striation towards one apex as compared with its fellow; any marked increase of root shadows, especially if extending into the lung field; and any nodular appearance near the periphery, especially if associated with increased striation. In the more definite cases, the variations from the normal were usually quite apparent, and tended to support the view that these cases resembled the adult type of tuberculosis.

Dr. Agassiz thought the diagnosis of enlarged bronchial glands was too often made on insufficient evidence. Many signs had been described as characteristic, such as D'Espine's sign, parasternal and paravertebral dullness, and dilatation of the veins in the front of the chest. In his experience they were of little use. A radiogram might sometimes help in diagnosis of the condition, especially when the glands are caseous or calcareous and not merely swollen. Screening the chest in the oblique position had been said to be of value, but in his experience it had not been so.

The conditions chiefly involved in the differential diagnosis from pulmonary tuberculosis were non-tuberculous fibrosis of the lung; pleural effusion and empyema, either general or interlobar; generalised miliary tuberculosis; spontaneous pneumothorax; syphilis of the lung, which was probably much more common than was generally supposed; thickened pleura; and cysts and new growths. In almost all these conditions radiological examination would settle the question, while in empyema and pleural effusion the exploring needle would clinch the diagnosis. It was remarkable that in non-tuberculous fibrosis of the lung the radiogram showed little abnormality in comparison with the wealth of physical signs. The opposite was often true of tubercle. Enlarged tonsils and adenoids might cause impairment of the note and weakened breath sounds over one lung, but the radiogram appeared normal. Removal of the tonsils and adenoids would cause the abnormal signs to disappear.

"The Potentially Tuberculous Child."

Dr. W. BURTON WOOD (London) emphasised the unsatisfactory nature of the term, "potentially tuberculous child." Admittedly it was easier to obtain treatment for a delicate child by labelling it as pulmonary tuberculosis, but it was fairer to give the child the benefit of the doubt. The need for a careful revision of the whole subject had been brought home

to him by two investigations which he had carried out. The first concerned the condition of 50 children drawn from dispensaries and sanatoria, and admitted to Victoria Park Hospital for diagnosis. The clinician, the radiologist, and the pathologist in coöperation tried to determine whether a diagnosis of pulmonary tuberculosis was justified in each case. In only 40 per cent. was any evidence found of tuberculosis, either past or present, and in most of these it was at least doubtful whether tuberculosis was responsible for the malnutrition and debility which had suggested such a diagnosis. His second observation concerned 50 cases of adolescent and young adult phthisis in a sanatorium for women. The analysis showed that not one of the 50 had ever been in a children's sanatorium, and a clean bill of health in childhood was the rule. He concluded that at least half of the children attending the average tuberculosis dispensary are not suffering from tuberculosis at all, and that the "tuberculous seedling" was not the precursor of the adolescent consumptive.

Dr. Wood agreed with Dr. Agassiz about the existence in children of the adult type of phthisis, but he thought the cases were rare, only three or four being admitted to Victoria Park Hospital each year. He grouped with this type those cases of broncho-pneumonia with a "positive sputum." His second group of miliary tuberculosis of the lungs included cases of fatal miliary disease and also those rare cases in which recovery followed pulmonary tuberculosis of an apparently miliary distribution. In these tubercle bacilli were difficult to find, and diagnosis must depend on physical signs in conjunction with X ray evidence. He thought that there was justification in diagnosing lymphocytic pleural effusions as tuberculosis in spite of the fact that tubercle bacilli were very rarely found in the fluid. There were also cases of undoubted "juvenile infection," as shown by the calcareous nodes in the lungs and calcareous deposits in the root lymph glands. Dr. Wood admitted that the gap between primary infection in childhood as revealed by Ghon's foci and infected hilar glands and the subclavicular infiltrations typical of adolescent phthisis had not been bridged. The juvenile type of infection was only clearly recognisable in radiograms when calcification had occurred, and when danger, or, at any rate, immediate danger had passed.

In differential diagnosis exclusion must play an important part. We should consider defects of the gastro-intestinal system, infections of the upper air passages, notably the presence of enlarged tonsils and adenoids; rheumatic disease; and infections of the urinary tract—as, for example, *coli* bacilluria in small girls; syphilis of the lung; chronic pulmonary catarrh, including fibroid lung and bronchiectasis; and finally social causes for malnutrition were too often forgotten.

In summing up he thought that diagnosis and notification of pulmonary tuberculosis was justifiable: (1) When physical signs indicated disease of the adult type and T.B. were found in the sputum or fæces. Also when with signs of broncho-pneumonia T.B. were found. (2) When the signs and symptoms of miliary tuberculosis were confirmed by radiological evidence. (3) When pleurisy with effusion was present and was not due to any other demonstrable cause. He thought that those cases of suspected primary infection which gave a definite positive reaction with the Pirquet or Mantoux skin tests or possibly a positive complement-fixation reaction, together with signs of toxæmia not accounted for by other evident sources of infection, should not lightly be diagnosed as pulmonary tuberculosis. The open-air school and not the sanatorium was the place for the delicate child.

Clinical Features in Children.

Dr. B. E. SCHLESINGER (London) thought the adult type of phthisis in children was rare, and suggested that Dr. Agassiz's clinical material was somewhat concentrated, because it was largely these definite and selected cases which were treated in his sanatorium. As regards the diagnosis, repeated mild attacks of bronchitis might be the earliest sign, but they differed in no way from ordinary bronchitis, and it was only when the disease was anticipated or when tubercle bacilli were discovered in the sputum that the diagnosis could be made at this early stage. Close attention should be paid to the family history, since direct contact with active consumption in adults was the greatest source of danger to the child.

Dr. Schlesinger later referred to the question of tuberculous broncho-pneumonia and epi-tuberculosis. The first was not uncommon in childhood, whilst the second was a rare and peculiar variety first described by Eliasberg and Neuland in 1920. The important distinction between the two types was that tuberculous broncho-pneumonia was invariably fatal and epi-tuberculosis almost invariably followed by recovery. The chief manifestation of the latter was an extensive area of consolidation usually confined to the right upper lobe. This area was dull on percussion, and on auscultation the breath sounds were tubular although no adventitious sounds were heard. Chronicity was a characteristic feature of these lung changes and they had been known to persist for nearly a year. The condition had to be diagnosed from an ordinary unresolved pneumonia and from tuberculous broncho-pneumonia. The former usually followed an attack of acute pneumonia and frequently left some degree of fibrosis, whereas a patch of epi-tuberculosis cleared up completely without fibrosis and radiologically only some thickened glands were seen at the hila. Tuberculous broncho-pneumonia was almost always fatal. Some would doubt the existence of epi-tuberculosis, and cases which corresponded to Eliasberg and Neuland's original description were certainly exceedingly rare. The speaker had seen only two such cases.

Discussing the significance of tuberculin skin tests, Dr. Schlesinger said that subcutaneous injection of old tuberculin with its local, focal, and general reactions as a means of diagnosis could at once be dismissed as obsolete and harmful. Most valuable of the various tests was the Mantoux modification of the Pirquet reaction. It gave no indication of the activity of injection since it would be positive whether the foci of infection were active, latent, or healed, but a positive reaction was of greater diagnostic value in very young children who were less likely to have old tuberculous lesions. A negative reaction at any age was of great significance.

Discussion.

Dr. L. S. T. BURRELL (London) found himself in agreement with most of the points made by the speakers. About 20 years ago congenital syphilis was diagnosed as often as tuberculosis was now, and it was remarkable how well the children did on hydrarg. cum creta. He thought that there was not much distinction between a sanatorium and an open-air school; the important thing was that the mode of life should be regulated. He agreed that it was not the delicate child who became the consumptive adult. In regard to the question of hilum tuberculosis he instanced the work of Wingfield, who injected into guinea-pigs material from the hilum glands of children dying from varying causes and found that a large majority of them contained tubercle bacilli. A few tubercle bacilli in these glands did not seem to matter very much. Again, he thought that a positive tuberculin skin reaction indicated a certain degree of immunity. Tuberculosis leading to a fatal issue in children seemed to be rare, but tuberculosis in the infant was usually acute. At puberty the disease was much more deadly than at most other ages.

Dr. JANE WALKER (Nayland) pointed out that night sweats disappeared as soon as the patients were admitted to sanatorium. Apparently in their homes there were too many clothes on their bodies and beds. She asked if members of the Conference had noticed a weakening of faith in floods of fresh

air. She agreed with Dr. Agassiz, that there was a marked contrast between the radiographic and physical signs in non-tuberculous fibrosis of the lung.

Dr. GEORGE JESSEL (Lancashire) agreed with Dr. Burton Wood that the tuberculous child was not the precursor of the adolescent consumptive, and that in the diagnosis of intrathoracic tuberculosis common sense and not far-fetched physical signs were necessary.

Dr. ESTHER CARLING (Peppard Common) wished to know what was going to be done about the child wrongly diagnosed as tuberculous. All of them could not be sent to open-air schools, because these were only to be had in the large towns. In her opinion, delicate children should be treated in sanatoria without notification.

Dr. WARD was in accord with the prevalent view about the value of paravertebral dullness. From the practical point of view one need not wait for elaborate tests to be done before treating a delicate child.

Dr. W. C. FOWLER (Pinewood) thought that negative Pirquet cases should be treated rather than cases giving a positive reaction, which he regarded as an indication of protection against tuberculosis.

Dr. HERBERT said that the question of physical signs in enlarged mediastinal glands needed further investigation. Although he did not very often find paravertebral dullness in children's chests, one could not, he thought, arbitrarily dismiss the sign as valueless. The dullness might not be due to the actual presence of glands, but to some reflex irritation. Dr. A. I. G. McLaughlin and he were at present engaged in the analysis of a series of cases in order to estimate if possible the value of the various signs said to indicate the presence of enlarged mediastinal glands.

Dr. MARGARET SHARP (Bradford) and Dr. NIVEN ROBERTSON (Chesterfield) were both sceptical about the value of paravertebral dullness, and the latter thought the diagnosis of intrathoracic disease in children an extremely shady business, although he admitted that the use of lipiodol made a very pretty radiogram.

Dr. G. M. MAYBERRY (Dagenham) said that he had not heard the importance of temperatures in diagnosis emphasised as much as he would have liked, and drew attention to the number of cases of so-called tuberculosis cured by attention to the tonsils and adenoids.

Dr. PEARSON thought that there was a great difference to be observed in the incidence and type of tuberculosis in children between 1 and 4 years and after that period. He also stressed the value of taking rectal temperatures.

Dr. DICKINSON said that in his experience patients with bronchitis did not readily develop tuberculosis.

Dr. C. H. C. TOUSSAINT (London) stated that in a series of 60 cases labelled as tuberculosis in childhood he knew of only two who had developed true pulmonary tuberculosis in early adult life. It seemed that we might be compelled to change our views and direct more attention to the young adult contact who appeared to be in good health, but who might well be in the latent stages of pulmonary tuberculosis.

The question of tuberculosis in childhood was of great administrative importance. It seemed to be the unanimous opinion of the meeting that there had been gross over-diagnosis of the condition, and if this were so much money had been and more still was being wasted on treatment. In London difficulty was arising owing to the fact that the County Council had limited certain open-air schools to notified cases of tuberculosis. Dr. Toussaint considered this to be a great mistake.

[The report of the two remaining sessions is unavoidably held over. These dealt with III. The Correlation of X Ray Findings in Pulmonary Tuberculosis, and IV. Gas Poisoning and Gunshot Wounds of the Chest in relation to Tuberculosis.]

A NATIONAL CAMPAIGN AGAINST RHEUMATISM.

AT a meeting held in London at the house of the Royal Society of Medicine on June 26th, a new association having for its object an organised campaign against rheumatic diseases was inaugurated under the title of The National Association for Combating Rheumatism. Sir THOMAS HORDER took the chair.

Letters of approval and encouragement were received from Sir George Newman (Chief Medical Officer of the Ministry of Health) and others and were put before the meeting by Dr. M. B. RAY, the acting hon. secretary, who also read the proposed constitution and policy of the Association. This emphasised the great crippling effect of rheumatic diseases on a large section of the community, and the important part they were playing in the production of sickness and suffering. It was felt by those responsible for starting the campaign that it was high time to make a concerted effort to deal effectively with the problem in all its aspects. About one-sixth of the total invalidity of the country could be charged to diseases commonly classed as "rheumatic"; they were responsible for the loss of three million weeks of labour, and for the payment of about two million pounds in sick benefit annually. At present there were proper treatment facilities for only a minority of sufferers, and it was felt that, since the causes of these conditions were still obscure, adequate facilities for research as well as for treatment should be provided. In the forefront of the Association's policy was placed the need for educating medical opinion upon early diagnosis and the importance of continuous treatment. The public should be told of the value of further research, whilst efforts directed towards prevention were essential. A system of following up cases needed to be organised, and efficient home treatment should be carried out. Bound up with this was advice about suitability of occupation, in which employers of labour might well be invited to interest themselves. Climatic and occupational factors must be carefully studied, and research must not be confined to the laboratory. Coöperation was required between the laboratory worker, the clinician, the biochemist, and the radiologist, and social workers also should be interested in the campaign. It was hoped that a system of uniform reporting of results would be arrived at; this would certainly aid the collection of statistics, and enable the value of various forms of treatment to be assessed. Another proposal was the establishment of treatment centres.

Sir CLAUDE HILL (Governor of the Isle of Man) formally moved that the Association adopt the proposed constitution and policy, and said that he was much impressed by the scope of the campaign now being undertaken. He hoped industrial interests would be successfully enlisted, and especially that clinics in different parts of the country would be established for dealing with these diseases. He also suggested that the organising secretary should be a man who would be able to travel, so as to ensure the sympathy of the industrialists, and persuade them that their support was needed. The Association, on the suggested lines, would be in a good position to meet what everyone cognisant of the facts would feel to be a real need.

Dr. MALCOLM CAMPBELL (Droitwich) seconded the resolution, and mentioned the great aid in the movement which could be afforded by the various women's organisations.

The CHAIRMAN agreed about the desirability of a close liaison between the industrial and the purely medical aspects of the problem, and said this had been in the minds of the Committee from the start. He mentioned that the Prime Minister had signified his willingness to become a member of the Council.

Mr. HENRY LESSER (President of the National Association of Insurance Committees) moved the

acceptance of a list of 74 ladies and gentlemen proposed as members of the Council.

Dr. E. I. SPRIGGS, in seconding, said that in discussing this matter with people and trying to get their help he had found it useful to point out that this was not a charitable appeal. Though rheumatism affected certain classes, no social grade was exempt. It was not proposed to start a new organisation which should replace or absorb any in existence, but one which should coöperate with other bodies for the prevention and adequate treatment of rheumatism. Much good work was already being done and it was "bad business" to have it done in different places separately.

The list of names was then accepted by the meeting.

Dr. FORTESCUE FOX emphasised the need of enlisting all who could help this important movement forward, and hoped that the international aspect would be borne in mind. Good work in this connexion was going on in other European countries.

Dr. J. VAN BREEMEN (Amsterdam), speaking as hon. secretary of the Ligue Internationale contre le Rheumatisme, referred to the Ligue's meeting to be held in October at Budapest, at which ten nations were already represented. Among points on which information from all sources would be welcomed were: the relation between acute and chronic rheumatism and the significance of serological and blood examinations. It would be a great help to receive for consideration at the Congress information and suggestions from England.

SCOTLAND.

(FROM OUR OWN CORRESPONDENTS.)

The Water-supply.

THE amounts of water in the Edinburgh reservoir are still extremely low and the Water Committee find it necessary to issue another warning. It is suggested that the consumers should aim at saving 2 gallons a day, which in the population supplied in the Edinburgh area would mean a saving of 1,000,000 gallons daily or 30,000,000 gallons a month. It was pointed out by the engineer that the use of water for flushing the drains and sewers is not wasteful but a necessary health provision, and the amount so used is comparatively small. The aqueduct from the Talla reservoir is being duplicated; but the duplication cannot be finished in time to relieve the situation this year. The manager of the Glasgow Water Department says that earlier in the year there was some anxiety, but at present there is an assured supply for four months. The notices posted in the tramcars some time ago calling upon the citizens to conserve the supply as much as possible seem to have had an effect.

Finances of Edinburgh University.

At a recent meeting of the University Court Sir Alfred Ewing, the Principal, said that the ordinary revenue had increased from £110,000 in 1913–14 to nearly £250,000 in 1927–28, and in the current session it would probably be £254,000. In these figures no account is taken of scholarships or bursaries for which the University is only a trustee. Of the whole regular income, about £48,000 comes as interest from endowments, Parliamentary grants amount to £91,800, and £107,000 is paid in fees. The ordinary revenue includes also about £6000 in donations and subscriptions (apart from capital donations), and in payments by local authorities for services rendered. Of disbursements the salaries of the teaching staff constitute the heaviest item—about £141,000. Pensions and contributions to the federated superannuation scheme account for £15,000; wages and grants to departments for expenses require £25,000, and libraries and museums about £9000. The cost of administration, including the salaries of the Principal and of members of the secretarial staff, is about £18,000. Some £30,000 is required for maintenance of premises, and £10,000 for alteration and adaptation of buildings, and for certain apparatus and equipment. The whole expenditure charged to the ordinary account for 1927–28 was about £253,000, leaving a deficit on the year's working of £3490. For the current year the estimated deficit is £4676, and is likely to be more. Sir Alfred pointed out that enlargement of the University, in respect of buildings, subjects, and staff, cannot fail to increase the annual charges that fall on ordinary revenue. As a rule, the increase in revenue from fees arising from a new development does not compensate for the increase in annual charges. Hence new sources of revenue must be found. It is for consideration whether, in the disposal of future capital grants from the Carnegie Trust, the trustees should not be invited to consider the wisdom of giving some relief from the increasing burden of maintenance, by granting sums for the better endowment of existing professorships and lectureships, whose value is established, but whose cost is now a burden on the general funds. The bequests and gifts which have made the expansion of the University possible have amounted to over £1,174,000 since 1916. Fully half of this has been invested to provide endowments for particular or general purposes, whilst the remainder has been or is being applied to various extensions of premises and work, including provision for an extensive and much-needed reconstruction of the Medical School.

An Auxiliary Hospital in the Country.

The Auxiliary Hospital of the Victoria Infirmary, Glasgow, at Philipshill, near Busby, was formally opened on June 27th. Beautifully situated in rural scenery, the grounds of the extension cover some 33 acres, and two of the eight pavilions which will ultimately be in use are now completed. It will serve as a convalescent hospital where patients, having passed the stage for constant medical and surgical attention, can be transferred to convalesce, and thereby release beds for the long list of sufferers awaiting admission to the infirmary.

Mr. William Gray, who presided, said that the natural evolution of hospital treatment seemed to demand that buildings in the cities should be regarded as clearing-houses for cases in the acute stage; when that stage had been passed the patients should be placed in brighter and more attractive surroundings than the ward of a city hospital. They would not have been able to proceed with the work if Mr. Gilchrist Macbeth had not offered to contribute £20,000 if it was undertaken. Miss Innes had contributed £13,000 for the building of a chapel and to defray the cost of a ward.

Major Walter Elliot, M.P., late Under Secretary of State for Scotland, who gave an address on the general hospital problem, spoke of the damaging effect of urban noise on minds and tempers. If this problem could not be solved for the healthy, let an attempt at least be made to solve it for the sick. Glasgow was on the verge of a further expansion and the governors of the hospital were to be commended for having got a little ahead of the procession which would shortly follow out of the city. Such expansion had been in the mind of the late administration in considering Scottish local government and the relation between the voluntary, city, and parish hospitals. Not only had the hospitals of Glasgow to be treated as a unit, but extensions outside the area had to be recognised as part of the system. The decision that public hospitals should be under one health authority meant that its relations with the voluntary hospitals must be closer than before, and by submission of local reorganisation schemes to the Department of Health it was hoped that overlapping might be avoided. He was certain that they could always look to the central department and to the present Secretary of State for Scotland for sound reasoned judgment on these great matters.

Appointments in Forfar.

Dr. J. A. Lowson, Provost of Forfar, and Dr. N. J. Sinclair, medical officer for the county of Angus, have been given commissions as Honorary Sheriff-Substitutes at Forfar Sheriff Court. Dr. Lowson, who is a native of Forfar, studied medicine at Edinburgh. He went abroad, and lived for many years in China and India. On returning to Scotland he entered the town council in 1905, and since then has been zealous in public work. He is a manager of Forfar Infirmary, and a justice of the peace. Dr. Sinclair is a graduate of Aberdeen. For about ten years he practised in Brechin, and 20 years ago was appointed medical officer for the county.

NOTES FROM INDIA.

(FROM OUR OWN CORRESPONDENT.)

Cholera in Bengal.

THE epidemic in Calcutta has reached more serious dimensions this year than in 1928. During the week ended May 11th 172 deaths were reported; in the preceding two weeks the death roll was 159 and 109 respectively; the maximum weekly figure in 1928 was 126. There is considerable evidence that many of the water mains are defective, nor is this to be wondered at when it is remembered that many of them are 50 to 60 years old. The prevalence of sediment during the dry months shows that the failure to keep up the pressure during the off-hours results in the suction of sewage into the mains. The provision of beds for cholera cases in Calcutta hospitals is inadequate and the health officer is unable, owing to shortage of inspectors, to exercise adequate control of markets and shops. The water-supply, however, has been chlorinated and mass inoculation is being organised.

The situation of a busy medical officer faced with a virulent outbreak of cholera is not an enviable one. The disease may, and often does, single out some remote village, far away from hospital facilities, and in a day all ordinary means of treatment may be exhausted. Under such conditions it is useless to talk of saline injections for a whole countryside, and any simple measures which are likely to prove effectual may be invaluable. Dr. J. W. Tomb has contrasted the results of various forms of treatment, as compared with cases untreated, in epidemics occurring in the Asansol Mining Settlement during the years 1922 to 1928. A rough clinical diagnosis based on the four cardinal symptoms of diarrhœa, vomiting, cramps, and suppression of urine was accepted in most cases, though in a considerable number it was supported by bacteriological examination; cases characterised by collapse were classified separately. The results of 2826 treated and 398 untreated cases are given under the headings of "cholera mixtures," "saline injections," "homœopathy," "essential oils mixture," and "untreated" respectively. Dr. Tomb comments on the good results which apparently followed homœopathic treatment, which he attributes partly to suggestion, partly to the fact that the common homœopathic remedy in the Settlement consists of spirits of camphor. Essential oils seem to have had the advantage over injections in the non-collapsed cases, while in the collapsed the effect was almost identical. It seems clear that there is a solid foundation for the reputation which the essential oils have obtained in many different places, and that they may be profitably employed either alone, or, where possible, as Dr. Tomb recommends, always in collapsed cases, in association with saline injections. One great advantage they possess is extreme portability.

Radium Institute at Patna.

In its seventh year of existence this Institute is still the only place in India where any considerable quantity of radium exists. Although a certain amount of radium is now available in some of the bigger centres, patients still continue to come to Patna from all parts of India and even from Burma and Ceylon. The Institute, which used to be at Ranchi, is now situated in the compound of the general hospital attached to the medical college at Patna, which trains students for the University degrees. Facilities exist here for securing every kind of specialist help when necessary. It will now be possible to teach students the use and value of this important therapeutic agent.

Workmen's Compensation.

Prior to 1923, in India, it was impossible for a workman to recover damages except when the employer was liable at Common Law for his personal negligence, and a deceased workman's dependants could only claim damages under the Indian Fatal Accidents Act of 1855 if the accident which caused the death was due to similar causes. But, profiting by the experience of countries in the West, India was able to introduce in 1923, at a single step, a practical piece of legislation providing for payment of compensation for industrial accidents. The Act, which came into force in India on July 1st, 1924, extends to the whole of British India, including Baluchistan and the Sonthal Parganas, which form a small district in Bihar and Orissa. Thus it does not apply to Indian States, but only to those parts of India which are under direct administration. The Act was subsequently extended to the Northern and Southern Shan States of Burma, Aden, the Military Cantonment of Bangalore, and the Andaman Islands. One Indian State, Mysore, has followed the lead of British India in this respect in introducing a similar piece of legislation this year. Thus the Act still remains limited in extent. It is also limited in scope, for it applies only to workmen in hazardous and organised industries. Owing to the peculiar conditions of India, it was not possible to include all classes of manual labourers; this would have introduced immeasurable difficulties in administration, especially, for example, in agriculture. The tendency in workmen's compensation legislation throughout the world is, however, to extend its protection to all manual labourers, but it may be many years before the Act in India can be so extended.

Women's Medical Service.

The difficulties experienced in providing well-qualified women doctors for hospitals in India without increased aid from Imperial revenues are revealed in the annual report for 1928 of the Committee of the Countess of Dufferin Fund. This year was a disappointment as far as the supply of first-class medical women through the Women's Medical Service was concerned. The Government of India's refusal to raise the annual subsidy to Rs. 5,00,000—which sum would have been sufficient to increase the cadre of the Service to 50—was followed by a further refusal to give even temporary help so as to obviate the necessity of cutting down the sanctioned posts until such time as Provincial grants were obtained. The Committee of the Fund was, therefore, reluctantly obliged to refrain from filling two vacancies in the cadre occurring during this year and to withdraw the Service doctor from the Women's Hospital at Hyderabad, Sind. This post was selected for reduction because inspection showed that the hospital was receiving little local support, while the minimum appliances and staff for efficient work were not being supplied by its committee. Further withdrawals will be necessary if support from the Provinces is not received, and the doctors removed will be from hospitals in those provinces which do not pay towards the services of their Women Medical Service doctors.

Another disappointment was the refusal of the Rockefeller Foundation to give any grant towards the research work on maternal and infant mortality which Dr. Balfour is pursuing at the Haffkine Institute in Bombay; but this has been mitigated by the response to Lady Irwin's personal appeal to wives of Governors for help in this all-India work.

Vaccination in the Punjab.

The experience of a well-vaccinated Indian province gives food for thought. The Punjab is evidently particularly fortunate in this respect, and the report of the Director of Public Health for 1927–28 furnishes ample evidence, if that were needed, of the good results. Continued progress is shown in the increase of 50,294 in the number of vaccinations performed during the year over the total of 1,242,090 in the previous year. The value of vaccination is now so generally accepted throughout the province that the annual reports can be expected to contain little that is new, apart from detailed improvements in the machinery of the department, and any necessary increases in the district staffs. Stress is laid, however, on the necessity of keeping a watchful eye on the inhabitants of remote areas; an epidemic occurring last year, in a hill tract over which the Punjab Government had no control, constituted a serious menace to the neighbouring British territory. Another source of danger is the survival of the old practice of inoculation, still widely prevalent in Persia and occasionally done surreptitiously in the Punjab. The district of Montgomery furnishes a salutary warning in the significant fact that with the lowest number of vaccinations in the past five years it combines the highest small-pox record. An Act has now been passed which will enable district boards as well as municipal committees to extend compulsory vaccination to areas under their control, and a start has been made in employing female vaccinators for purdah ladies—a very useful innovation.

Health Schools.

The success of the health school movement in India is emphasised in the report of the Lady Chelmsford All-India League. The training of the workers, says this report, is vital if child welfare work in India is to be continued on an efficient basis, and there are signs that this is being realised to a greater extent than heretofore. A new school has been opened in Lucknow under the auspices of the United Provinces Branch of the League, and the school at Madras is about to be recognised and made more efficient. It is very desirable for all health schools to have as far as possible a similar curriculum and similar standards. Only thus will the standard of the work be maintained throughout India.

POST-VACCINAL ENCEPHALO-MYELITIS.

PROF. TURNBULL'S REPORT TO THE CORONER.

AT the resumed inquest on the body of a girl, aged 14, who died on June 11th, being the 28th day after vaccination, Dr. R. L. Guthrie, coroner for the Eastern District of the County of London, read a report supplied at his request by Prof. H. M. Turnbull, director of the Bernhard Baron Institute of Pathology at the London Hospital.

I have, said Prof. Turnbull, made a microscopic examination of the brain and the spinal cord, and have found the changes which are characteristic of "post-vaccinal encephalo-myelitis." No other cause of death was found at the post-mortem examination. Post-vaccinal encephalo-myelitis is a particular kind of inflammation of the brain and spinal cord which very rarely follows vaccination.

Cause.

Post-vaccinal encephalo-myelitis, he continued, is now acknowledged everywhere to be definitely connected in some way with vaccination. This connexion was first shown in the London Hospital in 1922. It was then recognised in Holland in 1924. Since then the disease has been found in almost every country. I do not consider that it is a new disease, though it appears to have become more common. My attention was first drawn to the condition by finding the peculiar microscopic changes in a recently vaccinated boy in 1912. As soon as the disease was known, doctors remembered seeing similar cases in their practice in former years. Sacco, a hundred years ago, referred to nervous accidents consequent upon vaccination.

It has been proved that the disease is not due to any particular vaccinal lymph, and that it is not caused by any fault in the preparation of the lymph, or any contamination of the lymph, or any mistake in the technique previously recommended officially to doctors when vaccinating a patient.

The exact cause has not yet been discovered. Some consider that the disease is due to the vaccinal lymph itself acting upon persons who are abnormally sensitive to it. Most investigators believe that the vaccinal lymph lights up an infection which is lying dormant in the patient. The latter view has some support in the observation that a very similar inflammation may complicate measles, possibly other exanthemata, and antirabic treatment. But the nature of this supposed dormant infection has not been established.

Almost all authorities are agreed that the disease has nothing to do with "sleepy sickness" (epidemic encephalitis or encephalitis lethargica) or infantile paralysis (acute poliomyelitis).

Incubation Period.

The illness is usually definite on the 10th to 13th day after vaccination. It may begin earlier or a little later. It has never begun months or years after vaccination.

Incidence.

When all vaccinations are taken into consideration this complication of vaccination is extremely rare. I cannot obtain exact figures, but according to the Report of the Committee on Vaccination, Ministry of Health, 1928, there were 62 cases between October, 1922, and December, 1923, inclusive; during this period 1,048,000 tubes of lymph were issued. Very few of these 62 cases were proved by microscopic examination. At the very most, therefore, there was 1 case in 16,903 vaccinations.

The disease occurs in infants (one of my series was an infant of three months), children, and adults (my oldest was aged 22 years, but a patient of 50 years is included in the Report of the Committee on Vaccination). It is, however, relatively rare in infants under one year. Thus, in Holland from 1924 to 1926 a very exceptional number of cases occurred, but among 27,405 infants under one year of age who were vaccinated only 1 was affected (Report of Committee on Vaccination, 1928).

The great majority of patients have not been vaccinated before. There was a history of previous vaccination in one of my cases, but in this case (as in all my others) there were no scars of previously successful vaccination. I have not found in the literature at my disposal a definite record of the occurrence of post-vaccinal encephalitis after a previous vaccination which "took."

About half of those affected die (Report of Committee on Vaccination, 1928, 55 per cent.) but it is very important to point out that the remainder not only recover, but with few exceptions recover completely.

Methods of Vaccination.

The Commission on Vaccination (1928) recommends (p. 201)—but apparently there has been no official order—that "(1) In place of the officially advocated four insertions trial be made of vaccination and revaccination in one insertion with a minimum of trauma, and that multiple scarification and/or cross-hatching be deprecated. (2) Primary vaccination be performed in infancy, between the ages of two and six months at present; and that revaccination be offered at the time when a child enters school (5 to 7 years) and again on leaving (14 to 16 years)."

Dilution of vaccinal lymph, Prof. Turnbull concluded, is recommended and practised in the London Hospital by Dr. Bedson, but such dilution can only be made by a very few men of very special training.

EPSOM COLLEGE.

THE annual general meeting of the Governors of Epsom College was held on Friday, June 28th, at the Office, 49, Bedford-square, W.C., when the Chairman of the Council, Dr. Raymond Crawfurd, presided.

The report of the scrutineers showed that the following were the successful candidates for pensionships and foundation scholarships:—

Pensionerships.

	Votes.		Votes.
*Mylan, Dr. James G. ..	6723	‡Alford, Mrs. Mary A...	5417
*Johnstone, Dr. George W.	5936	†Benson, Dr. Alfred ..	4897
*Ogilvy - Ramsay, Mrs. Isabella	5673	‡Harris, Dr. Arthur G. R.	4584

* Ordinary Pensioners. † Highett Pensioner.
‡ Burney Yeo Pensioners.

Foundation Scholarships.

Porter, John D. .. .. 21,027 | Hogg, Robert D. .. 13,926

In proposing the adoption of the report and the income and expenditure account, the Chairman expressed the Council's regret that three warm friends of the College had died since the last annual general meeting—namely, Lord Rosebery, who was President, Dr. Francis de Havilland Hall, who was a Vice-President and for some time acted as Vice-Chairman of the Council, and Mr. Æneas Mackay, who was a member of the Council. Dr. Crawfurd stated that the sum of money required for the new sanatorium was not increasing as rapidly as the Council would wish, and he urged all friends of the College to procure donations for this special purpose. He added that if two sums of £5000 could be obtained the work would be started at once. In reference to the school, he said that progress was being made in all directions, and that the Council had brought into force a much improved scale of salaries and emoluments for assistant masters, and this had been greatly appreciated. The Council had received with great pleasure a sum of £1000 which Lord Beaverbrook had placed at the disposal of Mr. Stanley Baldwin in gratitude for his escape, as well as the escape of his associates, in a motor accident. This generous gift was being expended on the furtherance of scientific education at the College.

The report submitted to the Governors showed that since the last annual general meeting an open entrance scholarship of £100 per annum in classics at Pembroke College, Oxford, had been won by E. V. E. White. Eighteen candidates entered for the first examination for medical degrees, as follows:—London, 11 candidates, of whom 4 were completely successful, 5 were successful in two subjects out of three and 1 was successful in one subject out of three; Oxford, 2 candidates, both of whom were completely successful; and Cambridge, 5 candidates, 4 of whom were successful in all subjects, and 1 was successful in one subject. Sixteen candidates presented themselves for the University of London higher certificate, of whom 6 were completely successful and 8 were partially successful, whilst 8 candidates out of 12 were successful at the University of London matriculation examination. Of 87 boys who presented themselves for the University of London general school examination, 76 gained school certificates, 8 with honours, of whom 42 gained exemption from matriculation. Thirty-three boys obtained the War Office certificate "A"; out of 3 candidates for the Royal Military College, Sandhurst, 2 were successful, gaining 3rd and 70th places; and 1 boy was successful for the Royal Navy paymaster cadetship, taking the 6th place. The report further stated that A. L. Novis had been awarded his "cap" for England, being the second Old Epsomian to win his Rugby international during the last two years; W. J. Leaning had been elected captain of the Oxford University boxing team, and D. L. Rhys had represented Sandhurst in cricket, boxing, and fencing.

The Governors were able to elect only nine members of the Council to serve for a further period of three years, instead of ten as prescribed by the Act of Incorporation, owing to the death of one of the candidates, and it was decided to adjourn the meeting until Friday, July 26th, when a tenth member would be elected.

ELECTION OF DIRECT REPRESENTATIVES FOR THE DENTAL BOARD OF THE UNITED KINGDOM.

THE second election of direct representatives for the Dental Board of the United Kingdom took place last month, the votes being counted on June 17th–19th.

(a) Qualified Dentists Practising in England and Wales (2 Seats).

Four candidates were nominated—namely: Mr. W. R. Ackland, L.D.S., M.R.C.S.; Mr. W. H. Dolamore, L.D.S., M.R.C.S.; Mr. W. H. Gilmour, L.D.S.; and Mr. C. F. Rilot, L.D.S., M.R.C.S.

The number of voting papers issued was 5926; deducting dead letters (20) the possible number of voters was 5906; good votes numbered 3207; invalid votes (the larger part on account of failure to sign the identification envelope) 364, and 2335 took no part in the election.

The voting papers were sorted according to the first choices, and then, as the voting for the third place was seen to be so close, a further count was taken. The result was as follows: Ackland, 828; Dolamore, 1032; Gilmour, 679; Rilot, 668; total, 3207. The quota (one more than a third of the whole) was 1070. As no one had obtained the quota Mr. Rilot, having received the least number of votes, was declared defeated, and his votes transferred to the second choices shown on his papers. This produced the following result: Ackland, 925; Dolamore, 1509; Gilmour, 763; non-transferable, 10; total, 3207.

Mr. Dolamore had now obtained the quota, and he was declared to be elected, his surplus votes (439) being transferred to the candidate marked 2 on his papers in such a manner that each received his proper proportion. The result was shown to be: Ackland, 1056; Gilmour, 874; non-transferable, 207; retained for Dolamore's quota, 1070; total, 3207. Mr. Ackland was therefore declared to be elected.

No. of valid votes, 3207. No. of members to be elected, 2.

$$\text{Quota} = \frac{3207}{3} + 1 = 1070.$$

Names of candidates.	First count.	Second count.		Third count.	
	Votes polled by each candidate.	Transfer of Rilot's votes.	Result.	Transfer of Dolamore's surplus.	Result.
ACKLAND ..	828	+ 97	925	+131	1056
DOLAMORE ..	1032	+477	1509	—439	1070
Gilmour.. ..	679	+ 84	763	+111	874
Rilot	668	—668	—	—	—
Non-transferable papers ..	—	+ 10	10	+197	207
Totals.. ..	3207	—	3207	—	3207

(b) Qualified Dentists Practising in Scotland (1 Seat).

Two candidates were nominated—namely: Mr. W. Guy, L.D.S., F.R.C.S., and Mr. J. W. A. McGowan, L.D.S.

The number of voting papers issued was 925; deducting dead letters (5) the possible number of voters was 920; good votes numbered 660, invalid votes 60, and 200 took no part in the election.

The result was as follows: McGowan (elected), 391; Guy, 269.

(c) Qualified Dentists Practising in Ireland (1 Seat).

Two candidates were nominated—namely: Mr. J. Malone, L.D.S., and Mr. E. L. Sheridan, L.D.S., F.R.C.S.

The number of voting papers issued was 296 and there were no dead letters; good votes numbered 196, invalid votes 13, and 87 took no part in the election. The result was as follows: Sheridan (elected), 124; Malone 72.

(d) Dentists, 1921 (2 Seats).

Four candidates were nominated—namely: Mr. W. F. Bowen (Bolton), Mr. F. Butterfield (Lytham, Lancs.); Mr. A. H. Condry (Birmingham), and Mr. W. L. Edwards (Gloucester).

The number of voting papers issued was 7222; deducting dead letters (16) the possible number of voters was 7206; good votes numbered 3787 (4478); invalid votes (the larger part again on account of failure to sign the identification envelope) 390, and 3029 took no part in the election.

The voting papers were sorted according to the first choices, the result being as follows: Bowen, 855; Butterfield, 1820; Condry, 281; Edwards, 831. The quota (one more than a third of the whole) was 1263.

Mr. Butterfield, having obtained more than the quota, was declared to be elected, and his surplus votes (557) were transferred to the second choices. For this purpose all Mr. Butterfield's papers were re-examined, counted, and transferred in such a way that each candidate named as a second choice received the same proportionate share.

The result after the transfer of Mr. Butterfield's surplus was: Bowen, 1159; Condry, 419; Edwards, 946; quota retained for Butterfield, 1263; total, 3787.

As none of the other candidates had yet obtained the quota Condry was declared defeated and his votes transferred according to the preference, where expressed, to Bowen or Edwards. The result of this transfer was: Bowen, 1355; Edwards, 1117; non-transferable, 52; quota retained for Butterfield, 1263; total 3787. Mr. Bowen was therefore declared to be elected.

No. of valid votes, 3787. No. of members to be elected, 2.

$$\text{Quota} = \frac{3787}{3} + 1 = 1263.$$

Names of candidates.	First count.	Second count.		Third count.	
	Votes polled by each candidate.	Transfer of Butterfield's surplus.	Result.	Transfer of Condry's votes.	Result.
BOWEN	855	+304	1159	+196	1355
BUTTERFIELD ..	1820	—557	1263	—	1263
Condry	281	+138	419	—419	—
Edwards ..	831	+115	946	+171	1117
Non-transferable papers ..	—	—	—	+52	52
Totals.. ..	3787	—	3787	—	3787

Comments.

The total percentage of the electorate who took part in the election was 60·55 per cent., as compared with 64·49 in 1924. It was shown in this election, as in 1924, that it is not good policy to refrain from recording the order of preference for all the candidates. Those who recorded only their first choice took no part in the election of the candidate when it came to taking further counts, and their papers merely became "non-transferable." The sorting and counting of votes, and the necessary calculations were carried out under the direction of Mr. A. J. Gray, of the Proportional Representation Society.

Correspondence.

"Audi alteram partem."

THE MECHANISM OF FILARIAL PERIODICITY.

To the Editor of THE LANCET.

SIR,—The thoughtful and stimulating article by Colonel Clayton Lane on the mechanism of filarial periodicity in your issue of June 22nd has once more raised interest, at a most appropriate time, in this mysterious phenomenon. As Colonel Lane has done me honour by frequently referring to my own contributions on the subject (made some 17 years ago), I have thought it appropriate that I should set down some of my own views. There is nothing that I regret so much in my work on filariasis in Fiji that, apart from making certain observations on the lack of periodicity of the Fijian microfilaria and tracing its development in its appropriate intermediary host, I was unable to finally determine the exact mechanism of periodicity, except to assume (as had Manson in his original discovery) that this habit was an adaptation to the peculiarities of the mosquito host. This conclusion, which at that time appeared tenable on purely biological grounds, is not, as Colonel Lane has shown, so simple as it at first sight appeared to be. Colonel Lane sums up in favour of simultaneous cyclical parturition on the part of the female filaria as the cause of periodicity—that is to say, he assumes that in the case of the nocturnal *F. bancrofti*, the embryos are emitted by the parent worm into the blood stream during the night time, while in the non-periodic *F. bancrofti*, of Fiji and of Oceania in general, the embryos filter into the blood during the whole of the 24 hours, and that daily enormous numbers of microfilariæ are destroyed in and disposed of by the human body. In order that this supposition should fit in with the facts so far as they are known, we must credit each female *F. bancrofti* with extensive powers of fecundity. It is the only explanation at present forthcoming which will even roughly correspond with the known facts; but in order to explain the very large numbers of microfilariæ which may be found in the peripheral circulation of an individual, it is necessary to know the total volume of blood in the peripheral circulation on the surface of the body to which microfilariæ have access. This is an extremely difficult matter to ascertain accurately, and, even if we can do so roughly, there remains the uncertainty of the proportion of microfilariæ in the larger blood vessels.

As Fülleborn[1] states, it is readily understood that microfilariæ are held up in the smaller terminal capillaries, especially during their periodic appearances, but that they are more generally distributed throughout the larger arteries and veins also appears probable. Mackenzie and others have attempted to reckon out the total numbers of microfilariæ present in the blood of an average infected case as 40 to 50 millions, but these are mere guesses. I have had the assistance of Dr. W. K. Blackie in endeavouring to calculate out the amount of blood present in the peripheral circulation of an adult, 6 ft. in height, of 11 st. 6 lb. 12 oz. in weight, and with a surface area of 1·9 square metres. Assuming the blood volume to be 5 litres, the amount in the peripheral circulation would be 263 c.cm. I have frequently recorded in my work in Fiji counts of over 500 microfilariæ to every 20 c.mm. of blood, or one microfilariæ to every 20,000 red blood corpuscles. On this basis of reckoning, in the skin and subcutaneous tissue to a depth of 2 mm., there are contained no less than 6,575,000 microfilariæ. I have no means of ascertaining accurately the number of fecund and mature

[1] Fülleborn, F.: Filariosen des Menschen, Hand. d. Path. Mikro-org., 1929, p. 1103.

F. bancrofti present in a filariated individual at the one time. From such autopsies as I have been able to perform I should not place it at a figure higher than 20, which, if the periodic daily destruction of microfilariæ takes place, would credit a single female *F. bancrofti* with the power of producing some 328,000 embryos daily. Whether this is possible or not I do not think we are in a position to say. That certain helminths are prodigal in their reproductive capacity is well known, but I doubt whether there are any figures of the reproductive capacity in nematodes which would compare with these. As Clayton Lane suggests, some method of comparison might be obtained by a more minute study of allied species, such as the filariæ of birds of which the adults can be found and counted with greater certainty in the body than can the human species. Once only have I had the opportunity of watching the female *F. bancrofti* in the act of parturition, and this was, of course, under artificial conditions in a watch-glass in normal saline solution. The embryos emerged from the vulva in an unending stream, but it was impossible at the time for me to even estimate their numbers. I have hitherto hesitated in accepting the cyclical parturition theory, mainly on account of the only properly conducted experiments on the longevity of microfilariæ in the blood which were carried out by Fülleborn and which placed the life span of microfilaria repens of the dog, apart from the adult, at about two years. It may be, as Colonel Lane suggests, there was some flaw which vitiated the experiment. If his supposition of the daily destruction of millions of microfilariæ in the human body is correct, there must be some method of the disposal of their remains. One would expect that some evident pathological lesions would be produced. But this does not appear to be so. The fact remains that, from a clinical standpoint, those individuals with the highest microfilariæ count show fewest signs of what is generally understood as filarial disease. On Clayton Lane's hypothesis this would really indicate that the parent filariæ are located in some situation favourable to the uninterrupted passage of microfilariæ into the blood stream.

How can this question be determined? As far as is at present known there is no experimental animal in whose blood microfilaria bancrofti can survive. There only remains man himself, so that I would suggest that no great difficulty should be experienced in injecting a sufficient number of live M. bancrofti into a suitable volunteer in this country, so that by these means its life span could be determined and the conditions of Fülleborn's experiment reproduced. On the analogy of the embryos of other parasitic helminths it would be unbiological for the life span of microfilariæ in the blood stream to be a long one.

My mind is somewhat exercised to know how to fit in all the known facts with the theory of cyclical parturition. Let us recapitulate what they are: there are two varieties of *F. bancrofti* in man, morphologically indistinguishable from one another, each possessing a distinct geographical distribution, producing identical embryos, one with nocturnal periodicity, the other exhibiting no periodicity, developing in different species of mosquito intermediary hosts, and maintaining a different habitat in the human body. The latter is a point upon which insufficient emphasis has been laid. In the nocturnal *F. bancrofti* infections, the adults appear to live in the main lymphatic trunks in the neighbourhood of the thoracic duct, whence, presumably, they can pour an uninterrupted stream of embryos into the blood stream; in other words, they maintain a central location. Hence manifestations of disease brought about by lymphatic obstruction of the main trunk, such as chyluria, are associated with the nocturnally periodic *F. bancrofti*. On the other hand, the non-periodic *F. bancrofti* of Oceania inhabits the lymphatic glands, epididymis, tunica vaginalis, and perhaps the organs of the body. *It maintains a peripheral distribution.* Hence the filarial diseases produced are mainly those of enlarged lymphatic glands and the obstruction they give rise to. Chyluria is *completely* absent and elephantiasis of the forearm, extremely rare in other regions, is common and is due to the infestation of the epitrochlear glands by adult filariæ. How would this fit in with the theory of cyclical parturition? I can conceive that it does so by the fact that the embryos produced in the substance of the lymphatic glands have a much more complicated and circuitous route to pursue before they reach the blood stream which they enter by a constant trickle and thence appear in the peripheral blood capillaries in equal numbers both by day and by night. The next question which naturally arises is, how can one reconcile cyclical parturition with the inversion of periodicity in the nocturnal *F. bancrofti* by altering the sleeping habits of the host, as first shown by Mackenzie and afterwards confirmed by Manson? This is only explicable by the supposition that there is some substance in the blood of the sleeping host which has a stimulating effect upon the reproductive organs of the female parturient filaria. But how can that be reconciled with the diametrically opposite case of the diurnal *Loa loa* in which the embryos appear in the same vast numbers in the peripheral blood stream during the hours of daylight? Are we to suppose that in this instance this hypothetical chemical stimulant has the opposite effect? And how is it that the periodicity of the diurnal microfilaria loa cannot be (easily at any rate) upset, though as Külz has demonstrated,[2] this upset of periodicity during the voyage from West Africa to North America actually takes place?

Another difficulty I find in envisaging the entry of the microfilaria loa into the blood stream. How exactly is this brought about, except through the lymph channels? As far as we know, the adults of *Loa loa* live in the connective tissues, but the parturient female must have direct access to the lymph stream before her embryos can enter the blood. Again, in connexion with this last parasite: how can we reconcile the remarkable observations made by Manson and confirmed by myself that subsequent to the date of known infection by *Loa loa* a period of six to seven years may elapse before the entrance of the embryos into the blood takes place. It is inconceivable that it is necessary for this long period before the adult *Loa loa* becomes mature. Rather may we explain it on the supposition that the female or females of *Loa loa* find themselves in a position from which the embryos are unable to find their way into the blood, and it is while they are searching for a suitable breeding ground that they emit the embryos into the connective tissues and cause those curious "Calabar swellings," which may be said to resemble the lesions brought about by the infelicitous discharge of guinea-worm embryos into the body. I would therefore appeal for future study to be directed towards solving these crucial questions by a reconsideration of the mechanism of periodicity on a wider scale, by carefully weighing in the balance all the evidence which has been collected, not on the life-history of *F. bancrofti* alone, but also upon other human species.

Since my work on filariasis in Fiji and Ceylon has been completed I have had few opportunities of continuing observations on periodicity. I was, however, able in 1925 to confirm the observations of Külz that capillary constriction causes no diminution in the number of circulating microfilariæ (*Loa loa*). In this instance blood was taken periodically from a finger immersed in ice and the total number compared to that from the unfrozen member of the opposite hand.

More work is required to bear out conclusions based upon the appearance of microfilariæ in the urine. In pure chyluria such few observations as I have made go to show that the filarial embryos are usually dead by the time they appear in the urine,

[2] Fülleborn: Loc. cit., p. 1109.

but in hæmatochyluria, where there has been an outpouring of the blood into the chylous urine, I was able to ascertain from observations made on a case of the disease in a Japanese sailor in December, 1923, that numbers of live microfilariæ appeared in the urine passed at night time only and that they maintained a periodicity strictly parallel to that of the finger blood.

We may take it, then, that periodicity is a beautiful adaptation of nature, much more intricate and certainly not more wonderful than the many familiar adaptations in animal and plant life, of which it is possible to quote many examples. Its elucidation will come when all factors of natural history of the parasitic filaria worms are adequately studied and understood, and we may therefore conclude that there is nothing unbiological in the idea that the female filariæ have certain cyclical and well-defined periods for emptying the uterus of the imprisoned embryos.

I am, Sir, yours faithfully,
PHILIP MANSON-BAHR, M.D., F.R.C.P.

Weymouth-street, W., July 1st, 1929.

RIVERS POLLUTION.

To the Editor of THE LANCET.

SIR,—I am very glad to see that your paper has been giving prominence to the growing evil of river pollution, and it is much to be hoped that you will continue to impress upon your readers the importance of this matter. The apathy of all classes of the public to this national danger is very remarkable, and any newspaper which combats this apathy is doing a service to the country. Pollution not only destroys the amenities of the country and causes enormous annual loss to agriculture and other industries, but it diminishes the available water-supply and is a menace to the health of the whole population.

Medical men do not need converting to a belief in the evil effects of pollution but they may not fully realise how widespread the evil is and how rapidly it is growing. For example, the Clerk to the Trent Fishery Board lately stated publicly that in the 5000 square miles over which his Board exercised supervision, there was not a single authority that was dealing adequately with its sewage disposal. This is not an isolated case. It is merely an example of what is happening in almost every part of England. It is to the medical profession, more than to any other class, that those who are alive to the danger will look for support and indeed for leadership in the fight. Not only can medical men as individual missionaries preach a crusade against pollution, but collectively as a body, the profession can use the tremendous weight of its influence to press for amendment in our deplorably defective anti-pollution laws and their equally deplorable administration by our Government Departments.

I am, Sir, yours faithfully,
THOS. W. GOMM,
Hon. Secretary, Pure Rivers Society.

Lincoln's Inn-fields, W.C.2, July 1st, 1929.

BICARBONATE FOR BLACKWATER FEVER.

To the Editor of THE LANCET.

SIR,—I would like to support the statement made by Dr. Chesterman in the last paragraph of his paper (THE LANCET, June 29th, p. 1355) regarding the value of oral administration of bicarbonate of soda solution for blackwater fever. When in Kenya Colony I treated one case of blackwater fever in an Indian child 5 years old by that means. Another case of more practical interest is that of a European man aged 46 years, who had a fourth attack at some gold mines in an inaccessible district where there had been just previously two fatal cases. This man promptly retired to bed and consumed as much bicarbonate of soda in water as he could tolerate. Owing to the condition of the roads in the rainy season, it was 48 hours after the onset before I reached him and by that time hæmoglobin had disappeared from the urine and only slight jaundice remained.

It is well recognised that blackwater fever cases stand movement badly, and often, under tropical conditions, cases would have a better chance treated on the spot by such means than by submitting them to a lengthy and tedious journey to a hospital.

I am, Sir, yours faithfully,
C. P. DONNISON, M.B., B.S. Lond.,
Late Medical Officer, East African Medical Service.

Benfleet, Essex, June 28th, 1929.

A FICTITIOUS INTERVIEW.

To the Editor of THE LANCET.

SIR,—At the last meeting of the Urological Section of the Royal Society of Medicine on June 27th I gave, by invitation, a demonstration of motion and sound pictures of operations, and notice of the forthcoming demonstration was published in your issue of the previous week. There has since appeared in the public press a florid account of this demonstration with personal references to myself and a statement that I am supposed to have made at an interview. I am writing to assure my professional colleagues that I have had no communication with the press by word or in writing, and that no interview of any sort has taken place. I am taking steps to have this acknowledged by the journal in question.

I am, Sir, yours faithfully,
JOHN THOMSON-WALKER.

Harley-street, W., July 2nd, 1929.

*** A brief account of the demonstration appears under the reports of Medical Societies.—ED. L.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED JUNE 22ND, 1929.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 166 (last week 191); scarlet fever, 1786; diphtheria, 1012; enteric fever, 33; pneumonia, 873; puerperal fever, 47; puerperal pyrexia, 59; cerebro-spinal fever, 9; acute poliomyelitis, 2; acute polio-encephalitis, 2; encephalitis lethargica, 25; continued fever, 1; dysentery, 4; ophthalmia neonatorum, 110. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the Metropolitan Asylums Board on June 25th–26th was as follows:—Small-pox, 239 under treatment, 3 under observation (last week 269 and 10 respectively); scarlet fever, 1304; diphtheria, 1581; enteric fever, 13; measles, 181; whooping-cough, 499; puerperal fever, 29 (plus 6 babies), encephalitis lethargica, 121; "other diseases," 41. At St. Margaret's Hospital there were 19 babies (plus 7 mothers) with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns, including London, there was no death from small-pox, 3 (0) from enteric fever, 45 (4) from measles, 4 (0) from scarlet fever, 34 (9) from whooping-cough, 20 (0) from diphtheria, 44 (12) from diarrhœa and enteritis under two years, and 22 (2) from influenza. The figures in parentheses are those for London itself.

Liverpool reported 11 deaths from measles, Leeds 4, Nottingham and Sunderland 3 each. Birmingham reported 5 deaths from whooping-cough, Wigan and Manchester 2 each; no other large town more than 1. Birmingham, Liverpool, and Manchester each reported 4 deaths from diarrhœa and Salford 3.

The number of stillbirths reported during the week was 288 (corresponding to a rate of 40 per 1000 total births), including 60 in London.

JENNY LIND HOSPITAL FOR CHILDREN.—On Saturday last Princess Mary opened a new out-patients' block and special departments in this Norwich hospital.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

THE NEW PARLIAMENT.

THE new Parliament was opened on Tuesday, July 2nd. Owing to the recent illness of His Majesty The King, it was not thought advisable to submit him to the strain of a State opening, and the ceremony was therefore performed by Royal Commission. The Lords Commissioners were the Lord Chancellor, the Earl of Kintore, Lord Southborough, Archbishop Lord Davidson, and Lord Denman. The King's speech, which was read in the House of Lords by the Lord Chancellor, stated that while His Majesty regretted that it was not possible to address Parliament in person, he thanked Almighty God that he could look forward with confidence to that complete restoration of health for which the prayers of his people throughout the Empire with a sympathy and affection which called forth his deepest gratitude were offered during the months of his long and serious illness. The Government was at present considering the unanimous report of the independent financial experts appointed to draw up proposals for a complete and definitive settlement of the German reparation problem in preparation for a conference of representatives of the Governments concerned. A settlement of this problem would enable the occupying Powers to proceed with the evacuation of the Rhineland. It was the earnest hope of the Government, in coöperation with the Governments of the Dominions of India and of foreign Powers, to ensure an early reduction of armaments throughout the world. Consultations were taking place regarding the signing of the Optional Clause embodied in the statute of the Permanent Court of International Justice. The question of the resumption of diplomatic relations with the Soviet Government of Russia was also being examined. It would be the foremost endeavour of the Government to deal effectively with the continuing evil of unemployment. Schemes were being prepared for the improvement of the means of transport, for the stimulation of the depressed export trades, for the economic development of the overseas Dependencies, for the improvement of the condition of agriculture, for the encouragement of the fishing industry, and for the improvement of the facilities for the marketing of farm and fishery outputs. Measures were being considered in coöperation with the Dominion Governments to provide greater opportunities for overseas migration. Proposals would be submitted to Parliament in due course dealing with the reorganisation of the coal industry, including hours and other factors and the ownership of minerals. Inquiries would be undertaken immediately in order to discover means to coöperate with the iron and steel and cotton industries to improve their position in the markets of the world. Bills would be introduced for amending and consolidating the existing factory legislation and for giving effect to the obligations entered into in Washington in 1919. Legislation would be undertaken to promote an extensive policy of slum clearance and to make further provision for housing in urban and rural areas. The Government had decided that a time had come to investigate the whole field of legislation relating to the sale and supply of intoxicating liquor and commissioners would be appointed for that purpose. A general survey was proceeding of the various National Insurance and Pension schemes. Meanwhile a Bill was being prepared to amend the Widows', Orphans', and Old Age Contributory Pensions Act, 1925, so as to modify the conditions applicable to certain pensions and to make some increase in the classes of persons entitled to them. A measure would be introduced to remedy the situation created by the Trade Disputes and Trade Unions Act, 1927. At the recent General Election an extended franchise placed in the hands of the whole of the people of adult years the grave responsibility for guarding the well-being of the nation as a constitutional democracy, and the Government proposed to institute an examination of the experiences of the election so that the working of the law relating to Parliamentary elections might be brought into conformity with the new conditions.

MANCHESTER BABIES' HOSPITAL.—The annual report shows that last year there were 381 admissions and 316 discharges, and that the mortality was 14·59 per cent. The most numerous cases, amounting to practically one-third of the discharges, were those of chronic dyspepsia; of rickets, which came next, there were 42. Prematurity accounted for the largest number of deaths (12). The number of premature children increases every year; in 1924 it was four, but in 1928 it had risen to 37. It has been decided to immunise against diphtheria all infants whose parents are willing.

Medical News.

UNIVERSITY OF BIRMINGHAM.—At a congregation held on June 29th the following degrees and diplomas were conferred:—

M.D.—W. D. Beck and C. G. Payton.

M.B., Ch.B.—*W. C. Smallwood, †E. G. Abdel-Malek, F. A. d'Abreu, Adele M. Frankland, C. W. Kidson, F. G. Lewis, A. J. Moffett, E. H. Parkinson, H. R. Kalra, Ali Said, Christopher St. Johnston, F. R. Smith, George Steane, K. S. Thom, and Doris I. Wall.

* First class honours. † Second class honours.

Diploma in Dental Surgery.—B. D. Britten.

Application is invited for the Walter Myers travelling scholarship of £300 for research in pathology during the year 1929–30. Particulars will be found in our advertisement columns.

UNIVERSITY OF DURHAM.—At a Convocation held on June 27th the following degrees and diplomas were conferred:—

M.D.

Max Coll, O. C. Dobson, John Hare, A. H. Holmes, F. W. Marshall, P. M. Rivaz, Gladys Stableforth, A. J. Watson, and Reginald Wear.

M.B., B.S.

Sydney Adler, J. C. Arthur, W. F. Cross, Kenneth Daniels, C. E. Goldberg, H. W. T. Hall, Wilfred Hall, John Maddison, H. D. Ord, A. R. D. Pattison, J. K. H. Scott, J. B. Tilley, and Nora Walkinshaw.

B.HY. AND D.P.H.

Katherine M. Cellan-Jones, O. C. Dobson, and A. J. Watson.

UNIVERSITY OF GLASGOW.—At a ceremony of graduation on June 28th the folllowing degrees were conferred:—

M.D.—*J. S. Young, Moses Cohen, and J. C. H. Mackenzie.

* With honours.

QUEEN'S UNIVERSITY, BELFAST.—At recent examinations the following candidates were successful:—

M.D.

*Robert Armstrong, *W. H. Belford, Robert Evans, H. E. Hall, †R. A. G. Hamilton, J. B. Lyle, W. J. M'Cracken, W. A. Scott, and H. A. Warnock.

* With commendation. † Gold medal.

M.Ch.

F. S. Carson.

M.B., B.Ch., B.A.O.

First Class Honours.—W. J. Hamilton, T. B. H. Haslitt.

Second Class Honours.—J. S. Baxter, Hugh Caldwell, Joseph Gray, J. V. Hurford, C. J. Lord, James Montgomery, and D. A. C. Wilson.

Pass.—D. R. Cairns, Mary V. Cox, J. C. Craig, C. T. Denny, Charles Dick, J. M'K. Dundee, Mabel G. Hall, D. B. L. Harris, Margaret L. Irvine, Wilson Johnston, Marcus Killen, J. K. M'Collum, W. C. MacFaul, G. J. M'Gouran, J. A. MacHugh, James M'Master, Eveline M'Mordie, A. H. Montgomery, D. M. Quinn, L. F. Ragbir, J. G. Ryan, Thomas Scott, J. P. Thomson, H. B. C. M. Wallace, and Alexander Woods.

UNIVERSITY OF LEEDS.—At a congregation held on July 1st the degree of Doctor of Science, honoris causa, was conferred on Dr. Thomas Wardrop Griffith, Emeritus Professor of Medicine in the University.

Introducing Dr. Griffith, Prof. Veale spoke of his unbroken and close connexion with the Medical School for 46 years. Appointed professor of anatomy in 1883 at the early age of 26, he had at once brought the School of Anatomy to the front rank, and had identified himself with the interests and development of the Medical School in every direction. The present fine premises were largely due to his efforts, and the University owed him a lasting debt of gratitude for the careful planning and sound construction of this building, which, though now being substantially enlarged, would be a lasting memorial of his efforts. In 1910 Dr. Griffith had become professor of medicine, and as a clinical teacher he had shown the same mastery of style as had distinguished him in anatomical science. As a physician he had added much to the prestige of the school and to medical science. As an authority on cardiology, and more particularly the difficult and recondite problems of cardiac arrhythmia, his fame was surely established by accurate and extensive clinical research. Throughout his career he had been distinguished by a personal integrity of the highest order, and unswerving loyalty to the most honourable traditions and ideals of his profession, and a devotion excelled by none to the school which his scientific attainments had done so much to adorn.

The degree of Doctor of Medicine was conferred on G. R. Baxter.

BRITISH HOMŒOPATHIC CONGRESS.—Prince George and the Lord Mayor of London will welcome the delegates to this congress which is opening at the Connaught Rooms, London, to-day, Friday, July 5th, under the presidency of Dr. Thomas Macklin Dishington. It is stated that some 250 American medical men are attending the congress.

ST. BARTHOLOMEW'S HOSPITAL AND COLLEGE.—The Old Students' annual dinner will be held in the Great Hall of the hospital on Tuesday, Oct. 1st, with Sir Frederick Andrewes in the chair.

DREADNOUGHT HOSPITAL, GREENWICH.—The Duke and Duchess of York will open the Devonport Pathological Laboratory and the Devonport Nurses' Home at this hospital at 3 P.M. on Monday, July 15th.

DR. JESSIE MACGREGOR PRIZE IN MEDICAL SCIENCE.—The trustees announce the award of this prize, for the triennial period 1929–31, to Miss Helen M. Russell, F.R.C.P. Edin., for her record of work on malaria in the Vasiliki Valley, Macedonia, during 1925. The prize was founded in 1908 as a memorial to the late Dr. Jessie Maclaren Macgregor, of Edinburgh, and is of the value of £75.

A NEW EDENBRIDGE HOSPITAL.—Since its opening, eight years ago, the Edenbridge and District War Memorial Hospital has been carried on in a converted house which has become unsuitable owing to its structure and its situation on a noisy motor road. It has therefore been decided to erect, at a cost of £20,000, a new building of 20 beds on a three-acre site presented by Mr. T. A. Mason.

LIVERPOOL AMBULANCE SERVICE.—Hitherto the voluntary hospitals of Liverpool have possessed no ambulances of their own and have been dependent upon those belonging to the police, which are intended only for the conveyance of street casualties. Now, however, an ambulance has been purchased for £1500 by the Liverpool University Guild of Undergraduates out of the proceeds of the recent "Panto. Day," and is about to be presented to the Merseyside Hospitals Council.

INTERNATIONAL CONGRESS OF DERMATOLOGY AND SYPHILOLOGY.—The eighth meeting of this congress will be held at Copenhagen from August 5th to 9th of next year. The three princpal subjects of discussion will be the Ætiology and Pathogenesis of Eczema; Immunity, Reinfection, and Superinfection in Syphilis; and Tuberculosis of the Skin and Its Treatment. Further particulars may be had from the Secretary-General, Dr. Svend Lomholt, Raadhuspladsen 45, Copenhagen.

INTERNATIONAL POST-GRADUATE COURSES IN BERLIN.—Regular courses of post-graduate study are held in Berlin at short intervals, and in addition a number of special courses in various subjects have been arranged for October of this year and for March, 1930. Particulars of these may be had from the Kaiserin Friedrich-Haus, Luisenplatz 2, Berlin, N.W.6, which also provides information about "guest-assistantships" in the clinics, hospitals, and laboratories of the city.

ROYAL SOCIETY OF MEDICINE.—At the annual meeting of Fellows of the Royal Society of Medicine on July 2nd, with Lord Dawson, the President, in the chair, it was stated that the National Fund for the Acquisition of Radium was to be administered under a Royal Charter, which would probably be operative in the autumn. It was also announced that members of the Society resident in Sydney, New South Wales, with other medical men in that city, had made the first application to the Society to be allowed to form a section or branch. After the meeting a demonstration was given of a photostat with which the library has been equipped on the suggestion of Mr. Edwards, the secretary. This will make it possible to send to applicants in the provinces or abroad exact reproductions of pages or articles of any books or periodicals, thus fulfilling the circulating requirements without either depleting the library or interfering with its primary function of reference library. The whole process of reproduction occupies less than an hour.

ROYAL MEDICO-PSYCHOLOGICAL ASSOCIATION.—The eighty-eighth annual meeting of this Association will open on Wednesday, July 10th, at the Westminster City Hall, Charing Cross-road, London, W.C., and will continue on Thursday and Friday at the house of the British Medical Association in Tavistock-square. Prof. J. Shaw Bolton will take the chair at the first meeting, and in the afternoon, after a civic welcome by the Mayor of Westminster, the new President, Dr. Nathan Raw, will be inducted to the chair and will deliver an address entitled Fear: A Sociological Study. The Gaskell Medal and Prize for 1929 is to be presented on Thursday to Dr. Alexander Walk. The annual dinner will be held at the Hotel Metropole, Northumberland-avenue, at 7.15 for 7.30 P.M. on the same day. The proceedings on the two subsequent days will include a visit to Springfield Mental Hospital on Thursday afternoon and a discussion on the report of the Mental Deficiency Committee on Friday morning.

Mr. Arthur Greenwood, the Minister of Health, has appointed Mr. Joseph Compton, M.P., to be his Parliamentary Private Secretary.

SOUTH DEVON AND EAST CORNWALL HOSPITAL.—The first section of the extension scheme of this institution, consisting of a new children's ward, has been opened by the Countess of Mount Edgcumbe.

ULSTER HOSPITAL FOR WOMEN AND CHILDREN.—Last year the number of admissions to the wards, of out-patients, and out-patients' visits constituted a record, the total exceeding by more than 5000 the figures of the preceding year. The average cost per effective bed was £75 6*s.* 6½*d.*, and the daily cost of in-patients 4*s.* 1½*d.*

HOSPITAL OF ST. JOHN OF JERUSALEM.—The following appointments to the Order have been made:—As officers: Dr. K. F. Lund, Dr. R. C. Robertson, Dr. F. N. Kay Menzies, Major S. J. C. Holden, Dr. B. R. Billings, Dr. A. E. Porter, Major W. H. F. Noble, Dr. A. B. McMaster, Dr. A. L. Macleod, Major F. R. Humphreys, Colonel A. H. Tubby, Lieut.-Colonel C. T. Samman, and Dr. E. Burnet, As serving Brothers: Dr. G. Skeen, Captain H. F. J. Norrie, Dr. J. C. Bekitt, Major W. H. Borrie, Dr. J. Graham, Dr. A. Tennyson-Smith, Dr. K. Mackenzie, and Lieut.-Colonel G. E. Peacock.

UNIVERSITY OF LIVERPOOL ANIMALS' HOSPITAL.—On June 28th Lord Howard de Walden opened a new hospital at the Liverpool University Veterinary School. It is the first animals' hospital to be conducted in this country by a university, and is primarily intended for research and the instruction of veterinary students. The building funds have come from subscribers, one of the chief contributors being Lord Howard de Walden, and from the Development Commissioners, through the Ministry of Agriculture, who have offered £15,000 on a pound-for-pound basis. In addition an annual grant of £2850 will be received.

ROYAL MEDICAL BENEVOLENT FUND.—At a recent meeting of the Committee 39 grants were made amounting to £612. The following are notes on six of the cases helped by grants and annuities:—

Widow, aged 72, of M.R.C.S., whose husband received an annuity from this Fund during the last years of his life. On his death his widow had only the old age pension of £26. Voted £36. Her total income is therefore only £62 a year. Further assistance is being sought for this lady.

Widow, aged 80, of M.R.C.S. and L.S.A. The widow is totally blind. She has an income of £77 a year. The Fund voted £36, making a total income of £113, on which the widow and two daughters have to live. One daughter has to give her full time to looking after her mother owing to her infirmities, the other is trying to find work, but, as she is 47 years of age, has been unable to get employment as a clerk.

Widow, aged 75, of M.R.C.S. and L.S.A., has an income of £72 a year. Voted £26.

Daughter, aged 76, of M.R.C.S., with a private income of £20 and old age pension of £26. Voted an annuity of £30, making a total of £76.

Daughter, aged 84, of M.D. No private income, only the old age pension of £26. Voted an annuity of £30, making a total income of £56. This lady lives with her niece, a music teacher, who has to keep and maintain her on the above.

Daughter, aged 73, of M.R.C.S. Has only the old age pension of £26. Granted an annuity of £40, making her total income £66.

Subscriptions and donations should be sent to the hon. treasurer of the Fund at 11, Chandos-street, Cavendish-square, London, W. 1.

BRITISH PHARMACEUTICAL CONGRESS.—The British Pharmaceutical Society held its annual congress last week in Dublin, with the coöperation of the Irish Pharmaceutical Society and the Pharmaceutical Society of Northern Ireland. Our Dublin correspondent writes: "The weather was at its best and all who attended the congress had a pleasant week. The congress opened with a stimulating address from the President, Mr. R. R. Bennett, whose subject was the Changing Foundations of Materia Medica. He spoke of the transition from crude drugs to standardised products, and of the gradual replacement of certain natural products by identical substances synthetically produced. Among many other papers one of more than special interest was read by Mr. M. V. Sargent, of Naas, on the Native Materia Medica of Ireland. He drew attention to the luxuriant wild growth in parts of Ireland of medicinal plants such as digitalis, male fern, broom, dandelion, and couch grass, and he suggested that the collection of these plants could be made to pay from the commercial point of view. The social side of the congress was also successful. The banquet, held in the Mansion House, was honoured by the presence of His Excellency the Governor-General of the Irish Free State. A pleasant garden party was given in the beautiful grounds of the Royal Zoological Society of Ireland by the Directors of Messrs. Boileau and Boyd, Ltd., manufacturing chemists."

ASSOCIATION OF SURGEONS' SCHOLARSHIP.—The Association of Surgeons of Great Britain and Ireland invites applications for a surgical scholarship of £350 to be held for one year while the holder pursues some definite line of research or study. Further particulars will be found in our advertisement columns.

ROYAL DUNDEE INSTITUTION FOR THE BLIND.—At the annual meeting of this Institution it was stated that the number of blind employees was now 108, compared with 87 in 1920. The blind workers could not produce enough to enable the directors to make a profit, and therefore the increase in workers meant an increase in the anual deficit. Although the increase in goods sold was £1100, there was a net loss on the industrial account of £735 as compared with £496 last year. The general charity account showed a deficit of £2144 compared with last year's £2245.

HOSPITALS AND MOTORISTS.—Under this title the *Manchester Guardian* on June 29th published a selection of the results of a questionaire sent to voluntary hospital authorities for the purpose of discovering whether the problem of payment for treatment in motor accidents is as acute as some recent hospital reports have suggested. "The answers show," it is stated, "that many institutions are suffering a heavy financial strain; that very few of the patients contribute anything to the cost of their treatment; and that most hospital authorities agree on the necessity for some plan whereby payment should be assured." At the Manchester Royal Infirmary 140 in-patients were received, who spent 2708 days in hospital at a cost to the infirmary of £1196, and the patients' contributions amounted to £152. At Ancoats Hospital the cost to the hospital was £320 and £12 was received as patients' contributions. At the Manchester Victoria Jewish Hospital the cost was estimated at £450 and the cash received in return at only £50. At Oldham Infirmary during 1928 187 patients were treated at a cost of approximately £800 and "the sum received in respect of these patients was negligible." At the Royal Infirmary, Bradford (Yorks), 137 in-patients (who remained 2929 days in hospital) and 229 out-patients were treated at a total cost of £1174 and about £24 was received as contributions from the in-patients. At the Royal Infirmary, Derby, 100 victims of motor accidents were admitted during the year ended May 31st last, the average number of beds occupied during this period being 14. In addition there were a large number of out-patients treated. The cost of treating the in-patients was £1799 and the total contributions received towards their maintenance was £84 8s. At Warrington Infirmary £735 was expended in in-patient treatment alone last year and towards this the patients contributed £89. At Leeds General Infirmary 1135 motor accident cases were received. They cost the institution £4307 and towards that sum contributed £167. Much the same replies were received from hospitals at Blackpool, Sunderland, Bury, and other towns to the questionaire of the *Manchester Guardian*.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES.

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES, 11, Chandos-street, Cavendish-square, W.
FRIDAY, July 12th.—8.30 P.M., Continuation of Discussion on Colonel L. W. Harrison's Paper, Review of Experimental Work in Syphilis and its Possible Bearing on Man.

SOCIETY FOR THE STUDY OF INEBRIETY, 19, Park-crescent, Portland-place, W.
TUESDAY, July 9th.—4 P.M., Mr. W. McAdam Eccles: Some Gaps in the Study of Inebriety (Presidential Address), followed by a discussion on the Toxic Effects of Methylated Spirits and Impure Forms of Alcohol, to be opened by Sir William Willcox.

ROYAL MEDICO-PSYCHOLOGICAL ASSOCIATION.
WEDNESDAY, July 10th.—(At the Westminster City Hall, Charing Cross-road, W.C.), Annual Meeting.
THURSDAY and FRIDAY.—(At the B.M.A. House, Tavistock-square), Annual Meeting continued.

ROYAL SANITARY INSTITUTE.
SATURDAY, July 13th.—Annual Congress opens at Sheffield.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, London, W.
MONDAY, July 8th, to SATURDAY, July 13th.—ROYAL NATIONAL ORTHOPÆDIC HOSPITAL, 234, Gt. Portland-street, W. Mond. 1.30 to 2.30 P.M., Demonstration by Mr. Laming Evans. 2.30 to 4 P.M., in In-patients and Out-patients Depts. No fee.—LONDON LOCK HOSPITAL, 91, Dean-street, Oxford-street, W. Tues., 3 P.M., Clinical Demonstration by Major Corbett. No fee.—HOSPITAL FOR DISEASES OF THE SKIN, Blackfriars-road, S.E. Afternoon course consisting of instruction in Out-patient Dept. Special case demonstrations on Tues. Further particulars from the Fellowship of Medicine.

NORTH-EAST LONDON POST-GRADUATE COLLEGE: Prince of Wales's General Hospital, Tottenham, N.
MONDAY, July 8th.—2.30 to 5 P.M., Medical, Surgical and Gynæcological Clinics. Operations.
TUESDAY.—2.30 to 5 P.M., Medical, Surgical, Ear, Nose and Throat Clinics. Operations.
WEDNESDAY.—2.30 to 5 P.M., Medical, Skin, and Eye Clinics. Operations.
THURSDAY.—11.30 A.M., Dental Clinics. 2.30 to 5 P.M., Medical, Surgical, Nose, Throat and Ear Clinics. Operations.
FRIDAY.—10.30 A.M., Throat, Nose and Ear Clinics. 2.30 to 5 P.M., Surgical, Medical, and Children's Diseases Clinics. Operations.

EAST LONDON HOSPITAL FOR CHILDREN, Shadwell, E.
WEDNESDAY, July 10th.—4 P.M., Mr. K. J. Acton-Davis: The Surgical Treatment of Rickets, with Illustrative Cases.

ST. PAUL'S HOSPITAL, Endell-street, W.C.
THURSDAY, July 11th.—4.30 P.M., Mr. Claude Mills: Some Interesting Urological Cases with Demonstrations of Pathological Specimens and Radiograms of Same.

Appointments.

GRIFFITHS, J. I., M.B., B.S. Lond., has been appointed Third Asst. M.O. to the Hammersmith Board of Guardians.
MACGLASSON, J., M.B., Ch.B. Edin., Parochial Medical Officer and Vaccinator, Canonbie.
THOMSON, C. S., M.D., Ch.B. Glasg. D.P.H., Part-time Lecturer in Public Health Administration in the University of Belfast.
Certifying Surgeons under the Factory and Workshop Acts: GOODWIN, A. C., M.B., B.Ch. Oxf. (Newport, Isle of Wight); NELSON, H. P., M.B., B.S. Durh. (Brampton Cumberland); O'SHEA, J. J. M.B., B.Ch. R.U.I. (Chipping Norton); and PRESTON, F., L.R.C.P. Lond., M.R.C.S. (Norwich).

Vacancies.

For further information refer to the advertisement columns.

Association of Surgeons of Great Britain and Ireland.—Surgical Scholarship. £350.
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Willesden General Hospital, N.W.—Refraction Assistant. 50 gns.
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The Chief Inspector of Factories announces vacancies for Certifying Factory Surgeons at Callington (Cornwall) and at Felixstowe (Suffolk).

Births, Marriages, and Deaths.

BIRTHS.

BUTLER.—On June 25th, to Florence (*née* Jordan), the wife of Dr. M. F. Butler, of Beckenham-road, Beckenham, of a daughter.
HILLMAN.—On June 28th, at Bentinck-street, W., the wife of Oscar Stanley Hillman, M.S., F.R.C.S., Wilson-grove, Southsea, of a daughter.
SHAW.—On June 22nd, at a nursing home in London, the wife of Dr. F. R. S. Shaw, M.B., M.C., Tuz Khurmatu, Iraq, of a son.
THOMSON.—On June 28th, at Lavington, Barnet, Herts, the wife of Dr. N. Gray Thomson, of a daughter.

MARRIAGES.

FRANCE—CORKERY.—On June 26th, at St. Augustine's, London, Robert Scoular France, M.B., Ch.B., to Marjorie Griffin Courtenay, daughter of the late Colonel W. A. Corkery, Indian Medical Service, and of Mrs. Corkery, Ael-y-Bryn, Merthyr Vale, Glamorgan.

DEATHS.

HENDERSON.—On June 23rd, at Alister Cottage, Inverness, Lieut.-Colonel George Henderson, M.D., F.L.S., F.R.G.S., late I.M.S. (H.E.I.C.S.), in his 93rd year.
LEAPINGWELL.—On June 28th, Edward Jodrell Leapingwell, M.B., of Apsley Guise, aged 80 years.
MOXHAM.—On June 27th, at Aldborough, Marcus Camplin Moxham, M.R.C.S., L.R.C.P., L.S.A.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

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Notes, Comments, and Abstracts.

DISEASES OF THE JEWS.

IN opening a symposium on Some Diseases of the Jewish Race at the London Jewish Hospital Medical Society on June 13th, with Dr. A. GOODMAN LEVY in the chair, Sir HUMPHRY ROLLESTON said that diseases had been described as racial diseases of the Jews for no better reason than that the first recorded cases happened to have occurred among Jews. Such was the case with the condition known as dystonia musculorum deformans, or Oppenheim's disease. But there were diseases which if they did not appear exclusively among Jews were said to occur more frequently among them—e.g., thrombo-angiitis obliterans. It had recently been suggested that this disease was on the decrease among Jews and on the increase among Gentiles, and it was possible that the stress laid in the past on the racial nature of this affection had led to its being overlooked when it occurred among Gentiles. According to Telford and Stopford the alleged racial character of this disease was the result of a "topographical" accident. It was said by some that its course in Jews was earlier and more severe than in Gentiles, but the opposite view had also been advanced. On the question of amaurotic familial idiocy it must be pointed out that there was a series of allied conditions of which amaurotic familial idiocy and retinitis pigmentosa were the extremes, the first occurring early in life among Jews and the latter coming on much later in the case of both Jews and non-Jews. Both obesity and diabetes were relatively common in Jews, and it had been suggested by Joslin that Jews got diabetes because they were fat, and they were fat because of dietetic excess. But it must be remembered that Gaucher's and Niemann's diseases, which were disturbances of fat metabolism, were probably more frequent among Jews. Acromegaly had also been said to be more common among Jews, and anterior lobe pituitarism as a feature of the Jewish race was compatible with Keith's contention that the special effects of pituitary activity were best seen in the Caucasian type. That Gaucher's disease was regarded as being specially common among Jews was probably due to the accident that it had been extensively investigated at the Mount Sinai Hospital. Niemann's disease, which was probably a more severe type of Gaucher's disease, seemed to be more frequent among Jews—if one could argue from the 15 cases reported. It probably exemplified the rule suggested by the relationship of amaurotic familial idiocy and retinitis pigmentosa—namely, that in the Jewish race there was a constitutional factor which determined an earlier onset and a more severe form of certain diseases. On the incidence of cancer, the recent work of Sourasky had shown that whilst the total cancer mortality among Jews corresponded fairly with that of the countries in which they resided, there were some differences in the distribution of these growths, but that these differences were probably due to the mode of life led by Jews rather than to a racial factor. There appeared to be a definite resistance to tuberculous infection among Jews, which was perhaps to be explained partly by the infrequency of alcoholism among them.

Mr. A. H. LEVY pointed out that it was wrong to regard amaurotic familial idiocy as a specifically Jewish disease. Juvenile and adolescent cerebro-macular degeneration were generally looked on as being allied to amaurotic familial idiocy, but in his opinion were not at all allied. Mr. Levy touched on the question of the alleged greater frequency of glaucoma among Jews, which he could not substantiate from his experience, and on the incidence of cataract, which was probably not disappearing so rapidly among Jews as it seemed to be doing in the general population.

Cancer and Tubercle.

Mr. M. SOURASKY said that the fact which emerged from a recent investigation was that Jews as a race were neither immune from cancer nor specially prone to it. The statistics of six European capitals with large Jewish populations had been scrutinised, and in each of them the incidence of cancer among Jews followed closely that obtaining among their neighbours. On the whole there was a closer relationship between the Jews and non-Jews of any particular city than between the Jews of different cities. But apparently Jews had a definitely different incidence of cancer of the various organs from that of their neighbours.

Among Jews cancer of the generative organs and of the mouth seemed to be less common and that of the gastro-intestinal tract more so than among non-Jews. There were, however, established ætiological factors operating in the Jewish community capable of explaining these differences without assuming the operation of a problematic racial factor—immunity or predisposition, as the case might be. Thus the well-known association of cancer of the tongue with

chronic inflammation of this organ, which was so often of syphilitic origin, adequately explained the low incidence of cancer of the tongue in Jews, as syphilis was decidedly less common—and was still less common in the past—among them than among non-Jews. Not a single case of penile cancer had been recorded for Jews, whilst the disease accounted for about 1 to 2 per cent. of all cancer deaths among non-Jewish men. As for cancer of the breast, the incidence in Jewish women varied in different cities, being sometimes lower, sometimes a little higher than that for the rest of the population. In London the incidence among the poor Jews was lower than that among the wealthy. It was pointed out that among the richer Jews there were more unmarried women, the marriages were later, and the birth-rate was lower, all factors held to favour breast cancer. The remarkably low incidence of uterine cancer (one-third to one-half the number occurring in the rest of the population) might be attributable to the observance of the Mosaic system of hygiene, and it was of interest to note that this form of cancer appeared to be increasing in the Jewish community.

Dr. J. BURNFORD remarked upon the extreme rarity of any specifically racial diseases, whether of Jews or of other races. The topography of disease was not so much a question of racial predisposition and immunity as one of environment. Theoretically speaking there was a better case for racial immunity than for predisposition. Natural selection was more likely to produce a group of people resistant to certain affections than one which was specially prone to particular diseases, and racial diseases had a way of evaporating into thin air when they were carefully investigated. It was generally assumed that diabetes was very common amongst Jews; in the speaker's experience this had not been very noticeable.

Dr. W. M. FELDMAN said that the mortality-rate from tuberculosis was lower among Jews than among Gentiles, which was to be explained by the fact that the disease was less fatal among them. This could be seen from the greater number of Jews who responded favourably to treatment. In Dr. Feldman's opinion the explanation was probably that Jews acquired immunity from frequent exposure during childhood to mild doses of tuberculosis, being especially prone to this on account of the greater frequency of the disease among Jews, its milder character, and the greater degree of overcrowding. The greater care Jews bestowed on their infants and their greater sobriety probably also counted. The absence of drunkenness among Jews might be due to the fact that Jews usually took some food with their drink (thus unintentionally delaying the absorption of alcohol into the blood) and by the deterrent effect of public opinion, which in Jewish communities ostracised the drunken.

Eyesight.

Mr. A. SOURASKY said that in a recent investigation 1649 Jewish boys were examined as regards eyesight in a group of Jewish evening schools in the East End of London, and 600 non-Jewish boys in London County Council schools in the same district. The tests showed that the percentage of Jewish boys with visual defect was 43·2 as against only 21·7 of the non-Jewish. The conclusion often drawn from this, that the extra hours of evening study in Jewish classes were responsible for this grievous condition, was unjustified. children at the age of 5 and 6 who had not yet reached school age, and therefore could not be influenced by school-life, showed a similar amount of visual defect to that found at the school-leaving age, between 12 and 14. It was found on an investigation of defects seen among 516 Jewish and 892 non-Jewish children that the proportion of long-sighted and short-sighted was such as to suggest that among Jewish children short sight was twice as frequent as among non-Jewish. At the same time the tests led to the detection of very striking differences in the kind of long-sight observed among Jewish children. One type, "low hypermetropia," was found to be more common in Jewish children than the other forms of long sight, and this was not the case with non-Jewish children. The predisposition to short sight in Jewish children and the greater incidence among Jews would appear to be the concomitant of the fact that the anthropological characteristics of the eyes of Jews were such as to leave little margin between the normal and the myopic. Hence slight disturbances were more likely to result in myopia in Jewish children than in the non-Jewish.

Dr. J. BRANDER remarked on the earlier onset of dementia præcox among Jews.

In the subsequent discussion Dr. F. PARKES WEBER said that in his opinion thrombo-angiitis obliterans was a disease with an economic basis rather than a racial one. Dr. BERNARD MYERS held that many Jewish characteristics could be explained on the basis of endocrine disturbances.

Dr. D. NABARRO and Dr. N. PINES spoke on arterio-sclerosis and Dr. H. GAINSBOROUGH on the infrequency of syphilis in the older Jews.

A vote of thanks to Sir Humphry Rolleston was moved by Dr. L. MANDEL.

BOOKS ON CHILD CARE.

THE issue in all countries of numerous books on the care of infants and children is an interesting sign that mothers, and not only educated mothers, are abandoning tradition alone as a guide to nurture and are seeking help from science. A manifestation of this spirit in this country is the popularity of Baby Week, now being held in London for the thirteenth successive year. Reports of conferences and lectures stimulate women concerned with the rearing of children to seek further information and advice on choice of popular books is often sought from the family doctor. Among those produced recently three written by medical men deserve attention. "The Care of the Child," by Dr. Alton Goldbloom (New York: Longmans, Green and Co. Pp. 240. $1.50) is designed especially to act as a guide to perplexed mothers, and to provide them with up-to-date knowledge on the feeding and management of small children. In selecting the points to be discussed the author has been guided by the questions which have most frequently been put to him in the past. The normal limits of growth, development, and activity are well defined, and all that advice which deals with nursing and general management is admirable. The section on artificial feeding is rather more open to criticism. The statement appears that "the group of dried milks, and unsweetened condensed milks, are quite as satisfactory as ordinary milk"; those who do not believe this to be true would prefer that the perplexed mother should not see it set out so dogmatically. The chapter on diets of older children is a particularly useful one, a clear idea being given not only of the articles of food which are suitable, but of the quantities. "The Essentials of Infant Feeding" is the title of an excellent little book by Dr. E. A. Barton, of which a second edition has now appeared. (London: H. K. Lewis. Pp. 79. 3*s*. 6*d*.) This book provides an admirably clear introduction to the subject of infant feeding which would not be beyond the grasp of the educated mother, though it is adequate for the medical student. The teaching is well up to date. In the second edition complementary replaces supplementary feeding as the method of choice in mixed feeding, and recent views on vitamins have been included. "The Child's Diet" (H. K. Lewis. 3*s*.) is also a book which may safely be put in the hands of parents. This little book was originally designed by Dr. J. Sadler Curgenven for the use of his own patients and has now reached its third edition. It deals with the feeding of normal infants and children, and with diet in a few common nutritional disorders. It is written simply, and conveys throughout the impression of the writer's extensive practical experience. For the artificial feeding of infants comparatively simple dilutions are recommended; the actual details of preparation of the mixtures are not very clearly explained. The chapter on the feeding of older children is perhaps the best part of the book, and the closing chapter containing nursery recipes should also be of great assistance to mothers.

Rather more elementary in treatment are two little books, by Mrs. J. Langton Hewer, which have achieved great popularity. One, which is hardly more than a pamphlet, "The Baby of To-day" (Bristol: John Wright and Sons. Pp. 32. 4*d*.) is intended for those beginning to study creche work, girl guides, and the like, and provides sound teaching in concise form on the essentials of baby management, mental and physical. Rather surprisingly, long clothes are still recommended for the young baby, and the sample tables of food suggest that a child of 18 months should have none but minced meat, though the value of hard, crusty food is emphasised. The longer book, of 186 pages, entitled "Our Baby," and issued at 2*s*. 6*d*. by the same publishers, first appeared in 1891, and this year reached its nineteenth edition. It is addressed to mothers and nurses, and has for some ten years past served as the standard text-book for students taking the advanced examinations of the National Association for the Prevention of Infant Mortality. "Our Baby" is essentially a text-book, its 186 pages covering the ground connected with pregnancy, and such varied aspects of infant hygiene and care as feeding (natural and artificial), clothing, exercise and sleep, nursery life, and mental and moral training. Further chapters give an outline of minor troubles and ailments, accidents, and illnesses to which the young child is prone, with a section on nursery remedies and a final chapter on "Baby in the Tropics." The paramount importance of fresh air in the nursery is emphasised throughout the book, and also the fact that draughts may often be abolished by opening the window wider as easily as by shutting it. Dietitians will not all endorse the teaching that pasteurisation of milk does not kill disease germs and is not to be recommended. The book contains an immense amount of sane instruction and, with its 36 illustrations and numerous headings, presents an attractive appearance. Finally we may mention "A Handbook for Mothers," by C. Phyllis Armitage. (London: John Bale, Sons and Danielsson. Pp. 124. 2*s*.). The first three sections of this

little book, devoted respectively to "Pregnancy," "The Infant" and "The Child," are characterised by optimism born of common sense. The author is at pains to impress upon the mother the strong probability that she and her baby are normal, average people, and that good health and moderate progress, though less interesting to the neighbours than sensational excursions, are matters for pride and not for regret. At the same time, individuality must be allowed for, and a mother must be prepared, on occasion, to supersede an ideal theory by an intelligent sense of proportion, and not to suffer undue heart-burnings if the baby next door sleeps longer or gains weight more rapidly than her own. The book is designed especially for use by mothers who may be far from medical help, and Parts IV. and V., dealing with "Ailments of Infancy and Childhood" and "Infectious Diseases" include directions as to the use of certain drugs and forms of treatment unusual in a volume of this nature. A few of these instructions tend to be somewhat dogmatic. But, on the whole, the advice offered is thoroughly sound. A short appendix describes the use of some simple antiseptics and gives directions for first-aid and for the application of fomentations and enemata, together with a few useful recipes. The handbook is to be commended, as Dr. Quin Lennane, medical officer of health of Battersea, says in his foreword, for its "conciseness, simplicity of language, and avoidance of technical nomenclature."

A TUBERCLE-FREE HERD.

ADDRESSING a party of visitors to the Edinburgh Corporation dairy farm at Colinton Mains, Mr. A. Gofton, Chief Veterinary Officer for Edinburgh, lately gave a valuable account of the steps which have been taken there to secure that the cattle shall be free from tuberculosis.

He explained that the herd which had been formed under his regulation at Colinton Mains existed for one purpose only—namely, to supply milk of the best quality to the children in the City Infectious Disease Hospital. Up to a certain point the Corporation had run the herd on the usual stall-fed principle, and it took a great deal of persuasion before it was ultimately decided to embark on the policy of tubercle-free herd, with all the equipment necessary for producing milk of the best quality. When the decision to change over was reached two questions had to be considered. The first was the provision of the basal stock of tubercle-free cows, and the other was the alteration of the buildings to get the abundance of light and fresh air necessary for maintaining the health of the herd. At the change-over they ceased to buy cows in the ordinary way in the open market. At that time they had 27 head of cattle which were subjected to the tuberculin test, and of these 18 were positive and 9 negative. The 18 were removed from the herd and were disposed of for slaughter as soon as possible. The remaining nine were put into one byre, and the new purchases were put into another byre, the nine non-reactors being sold when they became dry.

The stock at the present time, said Mr. Gofton, consisted of 82 cows. Beginning in the spring of last year they bought as far as they could from tubercle-free herds. They then got heifers which had been grazing out in the open all their days, and never housed, and they had those which were selected tested. That principle proved to be sound, because they had found on subsequent tests that those young heifers had stood up to the test. In building up their herd they had to avoid the introduction of contagious abortion, and therefore, at a very early stage, they subjected all the cows to a blood test for evidence of this infection. They found two, which were at once segregated, and were disposed of where they would be able to do no harm. Further tests were now being made, and he was hoping to be able to say that this troublesome disease had now been eliminated.

Their aim had been to establish an Ayrshire herd, and it was vital that they should breed their own stock and replenish the herd by heifers of their own breeding. They were retaining only the Ayrshire calves, and ultimately these would take the place of the few Friesian, cross, and shorthorn cows that were in the herd. The 65 cows in milk in all stages of lactation were yielding 170 gallons of milk, or an average of 2⅝ per cow per day. Official recording was begun in the beginning of this year and since then 40 cows had been officially recorded, giving an average of 4 per cent. butter fat. Their output to the hospital was almost 152 gallons per day, the reminder of the total production of 170 gallons going to the workers and for calf-feeding.

Mr. Gofton's account of this farm deserves careful study, for it is important that milk supplied to an infectious disease hospital should be free from tuberculous infection, to which children suffering from scarlet fever, measles, and the other exanthems are especially susceptible. Colinton Hospital includes beds and shelters for cases of non-pulmonary tuberculosis, and it would obviously be absurd to provide these with milk which was likely to be infected.

MENTAL HANDICAPS IN LITERATURE.

A BOOK purporting to deal with some of the medico-psychological influences which tend to modify or handicap individuals in their literary efforts should find eager readers. One of the well-known Mental Handicap series,[1] attractively written by Dr. E. M. Cox, is devoted to this subject, and will be welcomed by those who have a taste for inquiry into the medical histories of great writers. The book is divided into eight chapters, of which as many as five are devoted to heredity, alcohol and other narcotics, poverty and affluence, the effect of epochal conditions, and toxæmic conditions. These headings suggest physiological rather than mental handicaps, though it is obviously true that such factors must influence the minds of writers. The author cites Poe and Chatterton as furnishing striking examples of the influence of heredity and environment on literary work and output, and it is true that both men came of neurotic stock. But it is at least probable that but for this stock neither might have written anything above the level of mediocrity. Of the opium-takers, Shelley, Coleridge, De Quincey, Francis Thompson, and Poe are quoted as having consumed narcotics, mostly opium, with profound results upon their works, both in quality and quantity. Coleridge died at the age of 62, and at one time he is said to have consumed two quarts of laudanum a day. Dr. Cox raises the interesting question as to whether the laudanum of the early nineteenth century had as great an alkaloid content as that of the present day.

The chapter on the effect of epochal conditions is one of the best in the book. The author has some happy hits at the literary tendencies of the modernist school. In them, he says, "we find violence exploited to the limits of mental endurance, and, in what is called poetry, we find crudity in expression, distortion in imagination, and often a distressing ignorance of the real value of words, their origins, their significance, and their use." Dr. Cox ascribes these tendencies in part to the ten-year failure to control adolescence after 1914, and believes that much of this violence will subside, and that a recognition of literary culture as something more than a mere defiance of tradition must take place. Of modern psychological views there is little to be found in these pages. Beyond a brief reference to the "inferiority complex," and "neurasthenia," there is no attempt to make more than a superficial analysis of mental handicaps. After all, the reasons for a man being a literary genius and an alcoholic may be the same. The fierce repressive paternal influence in the childhood of the Brontës had more to do with their gloomy brilliance than had any physiological factor. The author himself agrees that the presence of a neurotic strain in the character may itself produce a special intellectual development, and lay the foundation of success in literary work. This view promises more psychology and less physiology, a promise which is not fulfilled; but the little book is likely to stimulate the interest of a wide circle of readers.

BROWN *v.* WHITE BREAD.

To the Editor of THE LANCET.

SIR,—In a recent issue (June 15th, p. 1264) you dealt with the report on the Carbohydrate Value of Foods, issued by the Medical Research Council. This report inquires, "In time of need is it a *national* economy to feed wholemeal bread instead of white? . . . The answer depends on how efficiently the milled off bran can be utilised—e.g., for animal nutrition. . . . It depends upon the coarseness of the bran left with the meal and the amount of it."

The proper answer to this inquiry is given in the Report of the Food (War) Committee of the Royal Society on Digestibility of Breads. In response to a memorial from the Bread and Food Reform League, the Food (War) Committee of the Royal Society carried out important investigations at the Universities of Cambridge, Glasgow, and London bearing upon the effect of raising the scale of extraction of wheat to 90 per cent. and to obtain information as to how far the economical use of the national diet would be affected by changes in the milling standard. The researches made show that bread made from meal ground so that it could *all* pass through a 16-inch mesh wire sieve could be utilised by almost everyone. The bread used was well made, was submitted to clerical and strenuous workers, to women and children—and met with general approval. The important investigations undertaken by the Food (War) Committee of the Royal Society proved, the Report states, that by increasing the extraction of wheat from 80 to 90 per cent. there would be a gain of energy available for man "equivalent to an increase of about

[1] Mental Handicaps in Literature. By Edwin Marion Cox, M.D. With foreword by Theo. B. Hyslop, M.D., F.R.S.E. London: Baillière, Tindall, and Cox, 1929. Pp. 93. 3*s*. 6*d*.

1,700,000 calories of energy on the wheat milled each year in this country before the war or enough to extend the cereal supply of energy for more than one month." There would also be a gain of protein "equivalent to an increase of about 90,000 tons of protein on the wheat milled each year in the country."

Calories are, however, a very inadequate gauge of food and nutrition and apt to be misleading. This report from the Royal Society does not deal with the fact that wheat contains essential vitamins and organised mineral substances extracted from wheat in the manufacture of white flour. Digestion experiments show that these phosphates can be assimilated when the meal is finely ground. White flour is an imperfect food deprived of elements necessary for the maintenance of life. Birds fed on it and water have died, whilst those fed on wholemeal and water remained strong and healthy.

The report on Digestibility of Breads, however, enabled the Food (War) Committee to advise the Government to introduce a war bread of 90 per cent. extraction. It was often very badly made, but the nation was thus saved from what the late Mr. Bonar Law stated was the greatest peril encountered during the war—namely, starvation from enemy submarines.

I am, Sir, yours faithfully,

MAY YATES,

Founder and Hon. Secretary, The Bread and Food Reform League.

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MEDICINE IN WARTIME.[1]

THE Fourth International Congress of Military Medicine and Pharmacy was held in Warsaw in 1927. A summary of the important conclusions reached, and an account of the hospitable entertainments arranged by the Polish hosts has been set out in a small book which reached us this summer, when the fifth Congress was held in London. The decisions of the Congress are reported at length. In 1927 evacuation of wounded by air took a prominent place in the discussions, and as regarded evacuation generally the Congress decided that only if the high command had in advance fully acquainted the medical staff with its hopes and intentions could the best work be done for the wounded after a battle. As regards epidemic influenza, the best way of limiting an epidemic was thought to be in prompt diagnosis and immediate isolation; staffs of hospitals should be masked. To lessen the serious sequelæ of head wounds it was of first importance to secure that they should heal by first intention. Damage after arsenobenzol injections was thought generally due to unwise selection of the particular drug employed; only those thoroughly understood and approved, and with an arsenic content between 19 and 20 per cent., should be used. This matter was discussed by commissioned pharmacists of continental nations, no officers of similar rank and experience being present from the United States or Great Britain. The dental services took part for the first time in the fourth Congress. This record of an important Congress is in convenient form, and provides a readily available index to the extensive official reports that will be found in the greater libraries.

WOODHALL SPA.

THE Alexandra Hospital is this year supplementing its 34 beds for spa treatment by adding rooms for Plombières douches and for electrical treatment, as well as increasing the accommodation for its nurses. The bathing establishment was kept open throughout last winter for the first time, and the number of patients resorting to its bromo-iodine water has necessitated the provision, adjacent to the Bath House, of a hostel for those more advanced cases who at first find difficulty in reaching the hydropathic and electric treatment rooms, or who require definite nursing care. The need for fuller investigation is being met by the equipment of a pathological department, able to deal with disorders of metabolism, diabetes and the like, for which in this area no means for special treatment exist.

COUVADE.[2]

THE origin is unknown of the curious old custom, known as couvade, which still survives in some parts of the world; there the father lies in after the birth of a child instead of the mother, undergoes dietetic treatment, and receives the congratulations of the family friends. Mr. Dawson sets out the details of a religious rite practised in Cyprus and Ireland, which seems to have the couvade custom as an underlying feature, and proceeds to collect evidence that this custom is known in Europe, Africa, Asia, the Islands, and America. The last part of the book deals with the geographical distribution more fully. The author states that "the recorded localities in which couvade is, or has been, practised correspond to a remarkable degree with those associated with megalithic monuments and with customs usually connected with what has conveniently been called the heliolithic culture-complex, a complex comprising many curious customs and beliefs, amongst which may be specially mentioned sun-worship, mummification, ear-piercing, tattooing, and cranial deformation." Butler appears to have been misled by a story of Marco Polo when he alluded to the couvade in Hudibras:—"For though Chineses go to bed, and lie in, in their ladies' stead"—for the Chinese do not practise couvade, though it occurs in Japan. Incidentally, the reference to Hudibras given by Mr. Dawson (iii., canto i, 70) does not correspond with the lineation in our own copy of that work, where the lines are 707 and 708. The book is well got up, and there is a valuable bibliography; the frontispiece, which curiously enough is taken from a late Chinese manuscript on loan to the Victoria and Albert Museum, shows the couvade. It would be interesting to learn whether the subject was ever made the decorative theme on oriental china such as plates or utensils.

A HEALTH PROPAGANDA.

AMONG the good work which is being done by the Health and Cleanliness Council is the distribution of literature in coöperation with health societies, local authorities and other organisations, forming health propaganda. Last year the Council sent some 5,000,000 of its various booklets and leaflets to 2300 districts in England and Wales, while their publication, "Health and Cleanliness" is used as a text-book by teachers in many schools. The latest publication of the Council is a fairy tale, "On the Arch of the Rainbow," written by Mary Tyreman, its purpose being to inculcate in the minds of children the health value of soap and water and the need for smoke prevention. The book is attractively written and illustrated, and the Health and Cleanliness Council is prepared to distribute from the office, 5, Tavistock-square, London, W.C., a number of copies without charge to teachers, Girl Guide captains, and others interested in the teaching of hygiene among children.

THE NATION AND ITS FOOD.

THE production and distribution of food of the best quality at the very lowest possible price must benefit the community as a whole. People cannot be educated to choose the best kinds of food on which to maintain themselves and their families if such food is beyond their purchasing power. The actual price paid by a consumer for his comestibles includes, of course, the costs of transportation and retailing, and in many foodstuffs these are appreciably greater than the total costs of production. Dr. Addison discusses in a pamphlet[1] recently issued various ways in which the price of food might be reduced. He refuses to believe in the present system, under which we are told that it costs as much to retail a side of beef as it does to rear and feed the animal for three years, and that the expense of transporting and selling a cabbage is two or three times as great as that of cultivating it. If the nation does not deliberately take steps to devise a more rational system of production and marketing, Dr. Addison forsees that our food-supplies will shortly be controlled by huge combines of first-rate business men operating for profit, who will be in a position to dictate the price of all our essential articles of food. He sees no reason why the nation, with its experience of food control during the Great War, should not establish a National Marketing Board which would be furnished with a monopoly of the power of import and the sole right of purchasing for import. One of its main functions would be to keep prices steady for reasonable periods, as far as possible, with the object of encouraging production. It would trade as a responsible business organisation, presenting audited balance sheets to Parliament, and would aim at operating without incurring loss or accumulating profits. The scheme sketched out represents the nationalisation of our food-supplies, and even Dr. Addison suggests that it would be necessary to introduce it gradually, while experience in working out the details is being obtained. Those opposed to any form of nationalisation will obviously disagree with all of the suggested proposals. Nevertheless the fundamental principle of securing the ability of the poorer members of the community to purchase adequate quantities of such protective foods as are at present only too often beyond their means, cannot but be regarded with sympathy.

[1] Report on the Fourth International Congress of Military Medicine and Pharmacy: Warsaw, Poland, 1927. By W. S. Bainbridge, Commander, M.C.–F., U.S. Naval Reserve. The Collegiate Press, Menasha, Wisconsin, U.S.A. Pp. 248.

[2] The Custom of Couvade. By Warren R. Dawson, F.R.S.E. Manchester University Press. 1929. Pp. 118. 7*s*. 6*d*.

[1] The Nation and its Food. By the Rt. Hon. C. Addison, M.D., F.R.C.S. London: Ernest Benn, Ltd. 1929. Pp. 32. 6*d*.

Lectures

ON THE

PHYSIOLOGY OF GLYCOGEN

AND THE

RÔLE OF INSULIN AND EPINEPHRINE IN CARBOHYDRATE METABOLISM.

Delivered at the London Hospital

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LECTURE II.*—(PART I.)

THE RÔLE OF INSULIN AND OTHER HORMONES IN THE CONTROL OF CARBOHYDRATE METABOLISM: KNOWLEDGE GAINED BY STUDYING DIABETES.

SINCE insulin removes all the symptoms of diabetes it might be expected that an examination of the disturbances which cause them would reveal the nature of the action of this hormone. Let us in the first place, therefore, see to what extent this expectation has been realised. The symptoms of diabetes are so numerous that it is necessary for our purpose to decide which are fundamental, or primary, and which are merely secondary. Hyperglycæmia and glycosuria are certainly secondary and ketonæmia is also probably so, since it develops late. This leaves: (1) The low R.Q. (respiratory quotient) and its failure to become raised when carbohydrate is ingested; (2) the decrease of glycogen in the liver; and (3) excessive gluconeogenesis, as the primary symptoms. It has been customary to regard the first of these, the low and stationary R.Q., even during ingestion of carbohydrate, as evidence of a failure on the part of the organism to oxidise this foodstuff. Indeed, this is considered by many as the fundamental cause of the other symptoms, especially since, besides the low quotient, it has sometimes been possible, either on dogs rendered diabetic by complete removal of the pancreas or on these and other animals manifesting some of the symptoms of this disease as a result of repeated injections of phlorhidzin, to recover ingested glucose completely in the urine, and to observe a fixed daily ratio between the amounts of glucose and of nitrogen excreted in fasting or in meat-fed animals. Recent work, however, has failed to show that these results are always obtained, and since this greatly lessens their value as proofs we must examine them more fully.

IS OXIDATION OF SUGAR DEPRESSED IN DIABETES?

When glucose is given to either depancreatised or phlorhidzined dogs it causes an immediate increase in the amount excreted by the urine, and if we could assume that no change occurred in the endogenous metabolism it would be legitimate to compute the amount of unused glucose excreted by subtracting, from the total glucose excretion following ingestion of the sugar, that of a previous period of equal duration. But the nitrogen excretion usually declines decidedly as a result of the ingestion, so that, in order to allow for the lesser amount of glucose which this indicates must be coming from protein metabolism, the subtraction has to be made from a value which is obtained by multiplying the nitrogen excretion of the ingestion period by the D/N ratio of the previous period. Following the ingestion of moderate quantities of glucose both in depancreatised and in phlorhidzin-poisoned dogs a tolerable balance between the amounts ingested and excreted in excess is sometimes obtained under these conditions, but this result cannot be accepted as proof of the inability of the tissues to utilise the glucose, for if this were the case then no change should occur in protein metabolism. The method of calculation allows for this change, and nevertheless the results are supposed to prove that the glucose is not utilised. But, quite apart from this obvious fallacy, the actual results often fail to show close correspondence, either when they are thus calculated or when they are taken as a simple balance between intake of sugar and the excess which is excreted.

The Significance of the R.Q. in Diabetes.

This brings us to a consideration of the significance of the supposed fixity of the R.Q. as evidence of the inability of the organism to oxidise carbohydrate. In phlorhidzined dogs it is now known, through work emanating from Lusk's laboratory, that the R.Q. may rise considerably when sugar is fed, especially in divided quantities at intervals of an hour or two apart and, when allowance is made for the larger amount of carbohydrate which this shows is being metabolised, the excess excreted may actually exceed the amount taken. It must be remembered, however, that such animals are not truly diabetic, because they still can secrete insulin from the intact pancreas, and the variable effects which have been observed following the ingestion of sugar may depend on variations in the internal secretion of insulin. It is important, therefore, to consider the effects of ingestion of sugar in depancreatised dogs which are truly diabetic, inasmuch as there can be no internal secretion of insulin. When moderate amounts (20–40 g.) are given to such animals at one time there is seldom any effect on the quotient and most of the sugar can be recovered in the urine, but some preliminary experiments by de Pencier have shown that administration of sugar in divided quantities may cause the quotient to become raised and a considerable proportion of the amount ingested may fail of recovery in the urine. Hédon [26] has also reported numerous observations in which the R.Q. in depancreatised dogs rose considerably above the "diabetic" level of 0·707 at later stages after the withdrawal of insulin.

Neither in phlorhidzin-poisoned animals nor in depancreatised ones, therefore, does the behaviour of the R.Q., or the increase in sugar excretion following the ingestion of sugar, justify the claim that the organism has entirely lost the power to oxidise carbohydrate. There is, moreover, evidence to show that the diabetic organism can utilise the blood-sugar at a rate which is not demonstrably less than that in normal animals. Let me, very briefly, cite this evidence. When the abdominal viscera are removed in an anæsthetised dog or a decapitate cat the blood-sugar falls rapidly, and the speed at which it does so is apparently the same in a diabetic (depancreatised) animal as in a normal one (Macleod and Pearce,[27] Burn and Dale, &c.). Objection may be taken to these experiments on the ground that the fall in blood-sugar level in both normal and diabetic animals is somewhat irregular. This irregularity did not occur in the experiments of Markowitz, in which the liver alone was removed, in dogs, after making provision so that the blood could get from the posterior parts of the body to the heart independently of the inferior vena cava and portal vein. During the survival of the animal under these conditions the blood-sugar steadily falls, and it does at about the same rate in diabetic (depancreatised) as in normal animals, when allowance is made for the initially higher level of blood-sugar in the former

But, although diabetes causes no significant change in the rate at which sugar migrates from the blood into the muscles, this does not necessarily mean that the sugar has been equally well oxidised in both cases. We must be careful to distinguish between utilisation and oxidation. Indeed there is evidence to show that the diabetic tissues have lost something of their oxidative power. Thus, by measurement of the respiratory exchange from hour to hour, Markowitz found that the R.Q. behaved in the same manner immediately after hepatectomy in diabetic as compared with normal animals, but that it showed

* Lecture I. appeared last week and Part II. of Lecture II. will appear in a coming issue.

a difference later on. In both normal and diabetic animals the quotient to start with stood at between 0·85 and 0·90, but whereas intravenous injection of glucose, to compensate for the rapidly developing hypoglycæmia, caused the quotient to rise to unity in the normal animal, it failed to affect it in the diabetic (Table VII.). There was also a difference in

TABLE VII.

Time and condition.	Calories per kg. per hr.	R.Q.	Remarks.
Non-diabetic.			
9.40 A.M. .. .. Hepatectomy completed.	—	—	Wt. 7·8 kg.
10.15–10.30 .. .. Recovered from anæsthetic; put in cabinet.	—	—	Blood-sugar 0·074 %.
11–12	2·00	0·869	Animal quiet.
12.10 P.M. .. .. Removed.	—	—	Hypoglycæmic symp. Blood sugar, 0·052 %. Glucose injected; prompt recovery. Animal replaced in cabinet.
12.50–1.50	2·14	0·990	Animal quiet.
1.50–2.50	2·25	0·987	
2.50–3.50	2·43	0·936	
3.50–4.50	2·32	0·902	
6	—	—	Blood-sugar 0·100 %. Animal in good condition.
Diabetic.			
9–9.40 .. .. .. Hepatectomy completed and put in cabinet.	—	—	Wt. 12 kg. Depancreatised 2 days prev.
10–11	2·65	0·857	Very quiet.
11–12	2·63	0·886	
12–1	2·28	0·887	
1–2	2·05	0·855	Convulsions at end of period.
2.5 .. .. .. Removed.	—	—	Blood-sugar 0·054 %. Glucose injected; recovery.
2.35–3.35	1·70	0·831	Quiet.
3.35–4.35	1·63	0·851	Unconscious part of time.
5.30	—	—	Blood-sugar 0·042 %.

the behaviour of the calorie expenditure; in the normal animal this became markedly raised by giving sugar, but it was unaffected in the diabetic. We can suggest no cause for these differences unless it be related to the lingering presence of insulin in the tissues of the normal animals. In other words, the blood-sugar and muscle glycogen originally present in both conditions may be directly utilised by the muscles, but glucose from without be utilisable only in the presence of insulin still remaining in the normal tissues.

Objection may be taken to all of these experiments on the ground that the gases of the blood were not measured at the same time as the respiratory exchange. This objection would seem to be justified in light of the experiments of Verzar, Murlin, and Kramer, and, more recently, of Kilborn,[30] who have shown that the CO_2 content and the CO_2-combining power both decline markedly following evisceration, mainly because of relative over-ventilation of the blood in the lungs and a consequent blowing-off of CO_2. Indeed, the last-mentioned worker has shown that if precautions be taken to prevent the fall in CO_2 content—by breathing air with about 2 per cent. CO_2—the R.Q. does not become raised by evisceration. But it is unlikely that these results on eviscerated animals, which are either under anæsthesia or are decapitated, apply in the case of an animal in which the liver alone is removed, and the respiratory centre is intact. Moreover, there is a significant difference in the behaviour of the quotient in the two conditions, for it steadily rises from hour to hour after evisceration, whereas it falls after hepatectomy. There is therefore no reason to suppose that the rise in R.Q. following hepatectomy is due to any other cause than a change in the type of metabolism. In intact animals the quotient is the algebraic sum of a very low quotient contributed by the liver, because gluconeogenesis occurs mainly here, and a high one contributed by the muscles, where carbohydrate oxidation is the predominant process. That the quotient does not actually rise to unity after hepatectomy merely means that the muscles themselves possess some powers of gluconeogenesis. These become suppressed entirely when there is a plethora of carbohydrate in the presence of insulin.

Muscular Exercise in Diabetes.

To return to our main question—namely, is oxidation of carbohydrate seriously depressed in diabetes, there still remain two further types of experimental evidence to be considered. The first relates to the behaviour of the respiratory exchange following increased muscular activity, in normal as compared with diabetic (depancreatised) animals. It was found by Chaikoff and Macleod,[31] who induced greater muscular activity by exposing the animals to cold, that there is no difference between normal and diabetic animals. The consumption of oxygen in both cases usually became more than doubled during the first hour following exposure to cold, and the R.Q. rose as decidedly in the diabetic as in the normal animals. The results of these experiments are shown in Table VIII.

TABLE VIII.

Dog No. and weight in kg.	Respiratory exchange. Resting*	Shivering. First ½ hr.	Second ½ hr.	Second hr.	Third hr.	Excess R.Q. of first ½ hr.
	O_2 c.cm. per hour and respiratory quotient.					
16 (6·6)	5,125 (0·71)	12,478 (0·70)	7,900 (0·73)	13,958 (0·69)	10,704 (0·69)	0·68
17 (6·0)	3,116 (0·71)	5,706 (0·93)	6,088 (0·76)	—	5,409 (0·75)	1·2
17A (5·4)	3,742 (0·69)	5,742 (0·83)	6,508 (0·86)	5,473 (0·72)	5,530 (0·69)	1·09
19 (11·5)	5,030 (0·70)	7,484 (0·79)	8,708 (0·71)	9,048 (0·67)	8,726 (0·73)	0·97
Diabetic.						
1[1] (4·9)	3,583 (0·69)	7,484 (0·76)	8,112 (0·70)	7,351 (0·71)	6,633 (0·69)	0·83
1[2] (4·9)	3,794 (0·70)	8,796 (0·77)	8,784 (0·72)	7,722 (0·71)	7,859 (0·69)	0·82
1[3] (5·6)	4,292 (0·68)	11,028 (0·73)	10,658 (0·67)	8,649 (0·69)	7,238 (0·69)	0·75
9[1] (4·0)	2,391 (0·70)	4,094 (0·85)	4,144 (0·83)	3,931 (0·84)	3,664 (0·83)	1·05
9[2] (3·9)	2,653 (0·68)	3,852 (0·66)	3,844 (0·72)	4,211 (0·70)	4,173 (0·70)	—
11· (8·0)	3,957 (0·68)	9,201 (0·83)†	—	9,882 (0·76)	8,136 (0·70)	—
14 (5·6)	4,851 (0·70)	8,382 (0·77)	6,688 (0·72)	6,183 (0·71)	6,270 (0·69)	0·85
18[1] (7·6)	4,057 (0·69)	5,904 (0·82)	7,666 (0·65)	7,635 (0·66)	5,782 (0·75)	1·09
18[2] (7·0)	3,730 (0·68)	6,338 (0·73)	5,788 (0·72)	5,945 (0·69)	5,663 (0·70)	0·80

* Average of four hour observations. † 1 hour observation.

Note.—The weight of the dog and the respiratory quotient are shown in parentheses.

Heart-lung Preparation.

The second type of evidence is obtained from observations on the respiratory exchange in the heart-lung preparation. Notwithstanding the considerable experimental difficulties which are encountered in experiments of this type it has been established that the R.Q. is about 0·85 for the heart of normal (fed) dogs, but is much lower (about 0·7) for diabetic ones, and that whereas the quotient becomes raised somewhat (to 0·9) by adding glucose to the perfusion fluid in the case of normal hearts this does not occur when diabetic hearts are used. But these results do not furnish conclusive evidence that the diabetic heart had lost the power to oxidise carbohydrate because, as Starling and Evans [32] point out, profound modifica-

tions in tissue metabolism may serve to mask a moderate carbohydrate combustion. Moreover, it must be borne in mind that the heart is a mechanism of a somewhat different type from the skeletal muscles, as is evidenced by its power of prolonged beating when perfused with oxygenated artificial plasma, the formation of glycogen in it during starvation and in diabetes, and the peculiar behaviour of lactic acid.

We would sum up all this evidence as showing that the diabetic musculature still retains the power to oxidise carbohydrate, and if some of it may indicate an enfeeblement this is probably secondary to some other metabolic disturbance which interferes either with the preparation of the carbohydrate for combustion or with its derivation from other foodstuffs. We cannot therefore explain the action of insulin by stating that it directly stimulates the oxidation of carbohydrate.

Decreased Liver Glycogen in Diabetes.

What, then, is the fundamental metabolic fault in diabetes? What, in other words, is it that insulin controls so as to prevent this disease? Two other disturbances remain to be discussed—great reduction of the amount of glycogen in the liver and excessive gluconeogenesis. With regard to the former, although it is a striking fact that only traces of glycogen can be found in the liver of diabetic dogs, even after feeding with sugar, yet it is, I think, most important to remember that glycogen is seldom if ever entirely absent. We have always been able to detect its presence in the liver even after there has been total diabetes for several days, but it is possible that all traces might disappear if depancreatised animals were kept until they were moribund, and it is said that there is complete absence in phlorhidzin poisoning. The fact that some glycogen usually remains, however, indicates that the glycogenic function is not abolished. The glycogen found after death merely represents what is left over as the result of the action during life of two opposing processes, one of which—glycogenolysis—proceeds in the normal animal somewhat slower than the other—glycogenesis, whereas in diabetes the former process almost keeps pace with the latter, so that only a trace of glycogen is left over.

Increased Gluconeogenesis in Diabetes.

The evidence for the occurrence of excessive gluconeogenesis in diabetes is that large quantities of sugar continue to be excreted by a fasting animal long after all the carbohydrate which was stored in the body before the diabetes set in has been exhausted. Thus between the third and fifth days after the withdrawal of insulin and food from a well-nourished, depancreatised dog weighing 8·6 kg., as much as 52·7 g. of glucose were excreted. At this time there is not more than 1·2 g. of glycogen in the liver and possibly a total of 3·5 g. in the muscles, an amount which, in toto, is insufficient to furnish the energy required for living for more than an hour or so, let alone the sugar which is excreted. If, as is the present-day teaching, carbohydrate is the fuel which alone can be used by muscle for the production of energy, we must conclude that in the diabetic organism the process of gluconeogenesis, by which protein and fat are converted into glucose, is proceeding so actively that it provides an excess of carbohydrate which appears in the urine as glucose.

Gluconeogenesis is no doubt mainly a function of the liver, but it may also occur in the muscles themselves, as is evidenced by the fact that the R.Q. of diabetic animals after hepatectomy is well below unity (0·9). I have pointed this out in previous lectures,[33] and since then Cori and Cori,[34] basing their conclusions partly on work of their own and partly on that of Krogh and Lindhard, have drawn a distinction between the hepatic and the muscular processes of gluconeogenesis. They believe that glucose is a necessary product of the process in the liver, but is not so in that occurring in the muscles, and they assume that it is only the glucose produced in the liver which is excreted in diabetes. If we make the further assumption that the muscles cannot use this sugar, such a view is compatible with the known fact that the amount of glucose excreted daily by a fasting diabetic animal is tolerably constant, and it would explain why the blood-sugar apparently falls after hepatectomy as quickly in a depancreatised as in a normal animal. At the same time it implies that the muscles in diabetes have lost their power to oxidise the sugar brought to them by the blood, although they still retain that of forming glycogen. There is much to be said in favour of these views, and they are opposed to that which supposes that the diabetic animal derives most of its energy by a direct oxidation of fatty acid and of protein. This is the orthodox view, and it is based on the supposed constancy of the D/N ratio and the R.Q. in animals under the influence of phlorhidzin. As we have pointed out elsewhere, neither of these values is actually fixed in depancreatised animals.

But for our present purpose the important conclusion arrived at is that gluconeogenesis is proceeding excessively in the liver, where, also, deposition of glycogen has become reduced to a very low level. To what extent these two processes are linked together cannot be stated. It would be simplest to imagine that glycogen is formed in the liver in an inverse ratio to gluconeogenesis from protein and fat, the maximal deposition occurring when, in a normal animal, carbohydrate is being absorbed from the intestine and the least, in a diabetic one in which, owing to the absence of insulin, gluconeogenesis is at its maximum. This view is not incompatible with the known fact that glycogen accumulates somewhat in the liver during starvation in normal animals, for here it may be derived from lactic acid coming from the muscles, where it is derived from glycogen produced there by gluconeogenesis. It is, however, difficult to reconcile this view with the continued large deposition of glycogen and the excessive gluconeogenesis caused by epinephrine. We will discuss this question further at a later stage. Meanwhile the important thing to remember is that administration of insulin to the diabetic animal immediately causes glycogen to appear in the liver, not only when carbohydrate is also fed to the animal, but also without it (Cori). The question is whether the excessive gluconeogenesis is also checked. It is usually concluded that it is so since the nitrogen excretion becomes lessened, but otherwise there is no direct evidence to support this view. The behaviour of the R.Q. is often cited as further proof. This rises shortly after insulin is given. In a fasting, diabetic animal this cannot be dependent simply upon more carbohydrate being burned since there is, as we have seen, very little available carbohydrate and, as a matter of fact, more becomes deposited as a result of insulin. Hence the change in the quotient must depend on relatively less oxygen being required for gluconeogenesis, and since the actual oxygen consumption does not fall it is usually assumed that, pari passu with the lesser gluconeogenesis, there is an increased combustion of carbohydrate. The interpretation of changes in R.Q. is, however, very difficult, so many factors being involved.

Although the rise in R.Q. following insulin is compatible with the view that gluconeogenesis has become lessened it is no proof that this is actually the case. It is indeed impossible to get direct evidence that insulin inhibits gluconeogenesis. The most recent experiments are those of Burn and Marks,[35] who have used the artificially perfused, excised liver. They found that the total carbohydrate of liver and perfusion fluid became markedly increased as the perfusion proceeded, but was not affected by adding insulin to the perfusion fluid.

It is impossible in the light of present knowledge to decide what really is the primary metabolic fault in diabetes, and therefore to say how insulin acts in preventing this disease. It certainly cannot do so merely because it inhibits excessive gluconeogenesis in the liver, as was the view put forward several years ago by Laufberger.[36] If such were the case then insulin should fail to lower the blood-sugar in hepatectomised and eviscerated animals, but it quickly lowers

it, as was first shown by Mann and Magath. If gluconeogenesis also occurs in muscle Laufberger's view might hold.

Striking as may be the effects of insulin on the metabolism of depancreatised animals their investigation has taught us really very little regarding the fundamental nature of its action, and the chief reason for this failure is the necessarily limited number of experiments that can be done, the dog being the only laboratory animal suitable for pancreatectomy. If more could be learned concerning the quantitative behaviour of glycogen in the liver and muscles at various stages following administration of insulin to fasting, and to sugar-fed, diabetic animals, and the changes in glycogen formation compared with those in respiratory metabolism and in the relative concentrations of sugar and lactic acid in the blood entering and leaving the liver and muscles, great strides forward could, I am sure, be taken. On account of these difficulties the problem of how insulin acts has mainly been attacked by observations on the effects produced by injecting it into normal animals, especially rabbits, rats, and mice.

Effect of Insulin on Normal Animals.

In such experiments, however, it has at the outset to be recognised that we are dealing with a condition that is essentially different from that which is set up by giving insulin to diabetic animals. The insulin we inject in the latter case restores to normal a completely disorganised metabolism and any excess is probably quickly destroyed or excreted, whereas in normal animals it distorts the whole of metabolism by overstimulating certain phases of it. The excess causes some parts of the metabolic machinery to go too quickly or too slowly for other parts upon which it has no influence. Such disorganisation may lead to the accumulation of intermediary products of metabolism having a detrimental influence on the working of the machine as a whole. It may be because of a mechanism of this type that those toxic products accumulate which are responsible for the symptoms of hypoglycæmia and here I may refer to the work of Hynd, who suggests that accumulation of a substance called " glucosone " is responsible.

Increased Glycogen Formation and Carbohydrate Combustion.

In the light of the results obtained by insulin on depancreatised dogs, it was natural to expect that increased glycogen formation and increased oxidation of carbohydrate would together account for the disappearance of blood-sugar following injection of this hormone into normal animals. But it was impossible to demonstrate that this occurred; on the contrary, it was found that the glycogen of the muscles and of the liver actually diminished after insulin, and, although the respiratory quotient often changed so as to indicate a relatively increased combustion of carbohydrate, this did not always occur (in rabbits and dogs) until after the blood-sugar had completed its initial fall. In small animals, such as rats and mice, moreover, although the quotient might rise there was an absolute decline in carbohydrate metabolism and when glucose was given along with the insulin, it seemed impossible to account for the disappearing sugar by increased glycogen formation and increased carbohydrate utilisation. These results suggested the possibility that some hitherto unidentified intermediary product of carbohydrate metabolism was accumulating, and attempts were made, by chemical examination of the muscles and liver, to reveal its presence. The plan adopted in these experiments was to compare the amounts of glycogen, lactic acid, free sugar and lactacidogen in the liver and muscles of normal rabbits and of rabbits previously injected with insulin and sugar. It was found that less rather than more of each of these substances was formed in the injected animals. This result in itself would not, however, be inconsonant with the idea that some unknown substance had accumulated—for all of the bodies mentioned might have been used to form it—but if this were carbohydrate in nature, its presence should be revealed by an increase in the total sugar set free by hydrolysis, with acid, of the tissues (liver and muscles) of the insulin-treated animals. But the results of such experiments proved to be entirely unsatisfactory, partly because of their irregularity and partly also because of lack of knowledge as to what really happens when extracts of tissues containing proteins, as well as various extractives, are subjected to acid hydrolysis. When hydrolysis is performed with deproteinised tissue extracts the reducing power, originally small, is only slightly increased, and there is no difference between normal tissues and those removed from insulin-treated animals.

This failure to demonstrate the formation of an intermediary substance revived consideration of the possibility that, after all, insulin acts on normal animals, either in the same way as on diabetic ones—namely, by causing more glycogen to be formed, by increased carbohydrate combustion, and by suppressing the new formation of carbohydrates (Best, Dale, Hoet and Marks)—or, more simply, by merely stimulating glycogen formation and carbohydrate combustion (Lesser, Bissinger et al, and Cori and Cori). Each of these three groups of workers have performed experiments in which an endeavour has been made to compare, on the one hand, the amount of extra sugar disappearing as a result of insulin action, and, on the other, the increase in carbohydrate combustion—as calculated from the respiratory exchange—and the increase in glycogen deposition—as found either by analysis of the entire animal or of a supposedly representative fraction of it. Although I consider these experiments a very great advance over those performed by myself and my various co-workers, especially since they open a new avenue of approach to the investigation of the problems of carbohydrate metabolism, there are, nevertheless, several possible sources of inaccuracy in them, and I hope it will not be taken amiss if I take this opportunity to indicate some of these.

Experiments on Mice.

The first researches were those commenced in 1923 by the late E. J. Lesser, of Mannheim, and his collaborators, Issekutz, Bissinger, MacGrath, &c.[38] Mice were used, and in the first observations it was found that when insulin was injected along with sugar it caused more to disappear from the entire animal than when sugar alone was injected. In the absence of sugar injections, it was also found that insulin caused the total reducing substance (reckoned as glucose) plus the glycogen to become less in the animal. Thus MacGrath found an average of 54 mg. glucose and 63 mg. glycogen per 100 g. in untreated mice, and 26 mg. glucose and 57 mg. glycogen in others injected 30 minutes previously with insulin. The chief reduction was therefore in the tissue glucose and in all only 34 mg. of carbohydrate had to be accounted for—an amount which was inadequate to raise the R.Q. beyond the limits of experimental error. This made it impossible, by respiratory analysis, to determine whether all of the lost carbohydrate had been oxidised, so that the experiments were repeated with the difference that glucose was injected along with the insulin. The results showed a very close correspondence between the glucose which actually disappeared from the body and the amount which could be accounted for by respiratory analysis. It was noted also that glycogen synthesis was only moderately increased by the insulin injections. The authors point out that estimation of the extractable reducing substance as glucose may be fallacious and that substances having a lower reducing power, such as hexose phosphate esters, might have been formed in their experiments. Lesser, nevertheless, concluded from his researches that insulin acts by accelerating the oxidation of glucose and its synthesis to glycogen, and taking into consideration the work of others, as well as his own, he further concluded that it is in the voluntary muscles that this acceleration occurs.

Experiments on Eviscerated Spinal Preparation.

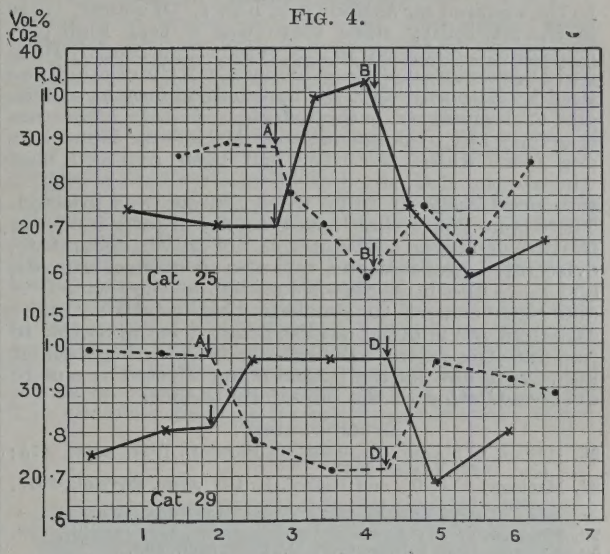
We will next consider the evidence of Best, Dale, Hoet, and Marks.[39] This was obtained from experiments on an eviscerated spinal preparation (cat), in which *the total loss of glucose* was calculated from: (1) the actual amount of glucose infused; (2) the decrease in blood-sugar; (3) the decrease in the "free sugar" of the muscles; and (4) the sugar added to the blood stream from the liver—as found from the decrease in the total carbohydrate (glycogen and "free sugar") of this organ; and the *carbohydrate utilised* from (1) the increase in the glycogen of the muscles, and (2) the increase in oxygen consumption. An almost exact balance was obtained between sugar disappearing, on the one hand, and that accountable for by increased oxygen consumption and glycogen formation, on the other hand, and the authors drew the conclusion that "the glucose which disappears from an eviscerated spinal preparation under the action of insulin is equal to the sum of the glycogen deposited in the muscles and the glucose-equivalent of the oxygen absorbed." I do not think that this conclusion should be accepted as final because of the following possible sources of error in the experiments:—

(1) *The decrease in the free sugar of the muscles* was determined by measurement of the reducing power (Hagedorn-Jensen method) of a watery solution of the residue obtained by evaporation of an alcoholic extract of muscle, after treating it with colloidal iron. The values found for different muscles of one leg of a spinal cat averaged 0·22 per cent. and no significant change occurred after leaving the preparation at body temperature for five and a half hours. The authors express doubt as to whether this is really "free sugar," but they believe, since the experiments are comparative ones and glucose "the only muscle constituent likely to vary significantly under the conditions of the experiment," that it is justifiable to consider a change in reducing power as due to glucose. After insulin they found that this free sugar declines in percentage and when allowance is made for the mass of all the muscles "a much larger contribution (is made) to the total of glucose lost than does the larger fall in the blood-sugar percentage" (bracketed words mine). Thus, in a cat weighing 3·725 kg. 0·42 g. glucose was calculated as being lost from the blood (the percentage falling from 0·27 to 0·088) and 1·44 g. from the muscles (the average percentage in four muscles falling from 0·262 to 0·182). Obviously, therefore, this is an important item on the credit side of the account, and it amounts, in two other experiments that are recorded, to 0·960 g. and 0·260 g. (the glucose infused being 3·250 g. and 4·80 g. respectively) and to 0·120 g. in another, in which the glucose infused, 1·680 g., was insufficient to prevent hypoglycæmia from developing. These figures show that the correction for free sugar varied greatly in the different observations and they raise the question whether, even with the reservations made by the authors, the figures can be taken at their face value. While there is no pretence that the reducing power gives a correct estimate of glucose present in the extracts, yet it is assumed, since the blood-sugar was being artificially maintained at a high level (which, however, was not the case in the third experiment referred to above), that the change in reducing power would represent a change in sugar to the same degree as a similar change is taken to represent one in blood-sugar percentage. Then again, Simpson and Macleod and Cori and Cori, using somewhat similar methods for estimating the free sugar of muscle in the rabbit and rat, have not found that insulin does lower the percentage of free sugar. With these points in view the risk involved in multiplying the actual changes found by a large factor are perhaps even more considerable than the authors imagine.

(2) *The sugar added to the blood stream from the liver* is allowed for by determination of the total of free sugar and glycogen in samples of liver removed at different stages of the experiment. It was found in a control experiment without insulin that the total loss of carbohydrate from the liver during a period of 50 minutes plus the sugar injected almost corresponded to the glucose equivalent of the oxygen meanwhile used, without there being any change in muscle glycogen. This result seems to justify the correction, but it appears to me doubtful whether the percentage of carbohydrate in a small portion will invariably represent that present in the liver as a whole. Since there was practically no circulation in the organ, it is not likely that the sugar in various portions of it would drain to an equal extent into the cava blood.

Coming now to the other side of the balance sheet the glycogen deposited in the entire musculature is computed by multiplying the average percentage found

FIG. 4.



The interrupted lines represent CO_2 in blood (volumes per cent.), and the continuous lines represent the respiratory quotient. A = eviscerated. B = lessened ventilation. D = breathing expired air. Time in hours.

in four muscles of the hind limb by the estimated weight of all the muscles. The reliability of this method is fully discussed in a paper by Best, Hoet, and Marks [19] and certain of its possible sources of inaccuracy are pointed out. But there are several curious properties of the eviscerated preparation which seem to me to indicate that it does not behave like the muscles of an intact animal. In the first place, as I have pointed out elsewhere, it is difficult to reconcile the constancy in glycogen in the muscles over several hours in preparations not injected with insulin with the current hypothesis that the immediate fuel used for the production of muscular energy is glycogen. The energy production in these preparations, which was at the rate of about 2 calories per kg. an hour, was apparently not dependent on glycogen, since this was the same at the beginning as at the end of the experiment, or if it was dependent on glycogen then we have to imagine that in each of the muscles just as much glycogen was being built up out of blood-sugar as was disappearing during the course of the experiment. The other alternative is that the fuel used was blood-sugar itself. The amount of sugar which analysis showed to be disappearing from the blood itself was far from adequate to account for the energy produced, but, when the sugar that was considered to be leaking into the systemic circulation from the liver was added to this, a sufficient amount was found to be provided in one of the experiments of Best, Dale, Hoet, and Marks. In either case there is something mysterious about the energy metabolism of the spinal preparation.

Even were these sources of error overcome there remains a more serious one, and this depends on the assumption that each 750 c.cm. of oxygen retained by the preparation corresponds to the oxidation of

1 g. of glucose. This would be the glucose equivalent of oxygen if the respiratory quotient stood at 1·0, but it is not permissible, in the light of Kilborn's experiments, to assume that this was so. Kilborn [30] in confirmation of earlier work by Vérzar and others, found that the rise in the R.Q. which follows evisceration is dependent partly on the appearance of lactic acid and partly on the relative over-ventilation of the preparation. This causes a blowing-off of CO_2 from the blood and tissues, as evidenced by a marked fall in the CO_2 of the blood, thus making it unsafe to assume that because the quotient was unity carbohydrate combustion was alone occurring in the eviscerated preparations. As a matter of fact Kilborn found that he could cause the R.Q. to return to about its original low level either by reducing the respiratory volume or by adding CO_2 to the inspired air as shown in Fig. 4. Of course, there is the possibility since there was a very high percentage of blood-sugar in the preparations used by Burn and Dale and Best et al—which was not the case in those used by Kilborn—that the metabolism may have been one exclusively of carbohydrate. In this connexion it is only fair to point out that Markowitz found in a dog from which the liver had been removed that whereas the R.Q. stood at about 0·9 to start with, it rose practically to unity when glucose was injected. There is no doubt that insulin sooner or later increases the rate of oxygen consumption, not only in decapitate, eviscerated preparations, but also in normal animals, and since the R.Q. rises somewhat in the latter it is doubtless correct to conclude that relatively more carbohydrate is being oxidised, but it is impossible to calculate the extent to which this is occurring without knowing in how far the R.Q. is being affected by a mere over-ventilation of the blood and tissues.

BIBLIOGRAPHY.

26. Hédon, L.: Arch., Internat. de Physiol., 1927, xxix., 175; also 1926, xxvii., 254
27. Macleod, J. J. R., and Pearce, R. G.: Jour. Physiol., 1913, xxxii., 184.
28. Burn, J. H., and Dale, H. H.: Ibid., 1924, lix., 164.
29. Markowitz, J.: Amer. Jour. Physiol., 1928, lxxxiii., 698.
30. Kilborn, L. G.: Jour. Physiol., 1928, lxvi., 403.

THE DEVELOPMENT OF PULMONARY TUBERCULOSIS,

WITH SPECIAL REFERENCE TO "EARLY INFILTRATION."

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IN no disease is it more important to establish the diagnosis early than in pulmonary tuberculosis; to this end much literature has been produced by many authors. The disease has usually been described as being of a slow insidious onset, the chief symptoms of which are cough (often most marked in the mornings), hæmoptysis, indefinite malaise, night-sweats, an intermittent low-grade pyrexia, and a progressive loss of weight. In the early stages the disease-process has been supposed to be confined to the apical region of the affected lung, the lesion at first being very small in size and in the course of time gradually spreading to involve more and more of the lung. The literature on the subject leads to the conclusion that physical signs in the early stages are extremely variable and difficult to establish, and that they are to be found in the apical region of the affected lung. Various authors lay particular stress on some percussion or auscultatory finding which, in their opinion, is almost diagnostic. The radiological findings reported as early manifestations are almost as variable and elusive as the physical signs. Tne sputum in the earliest cases (closed cases) is said to be negative when examined for tubercle bacillus.

"*Early Infiltration.*"

During recent years, on the Continent, particularly in France and Germany, a great deal of evidence has been adduced to suggest that the old teaching that the development of pulmonary tuberculosis is a slow, insidious process is erroneous and that, as a matter of fact, the disease has a comparatively acute onset. Assmann,[1] Redecker,[2] Lydtin,[3] Fassbender,[4] Braeuning,[5] Kayer-Petersen,[6] Ulrici,[7] Gran,[8] Rist and Amenille,[9] Frischbier and Bechmann[10] have reported series of cases in which the disease has been characterised by the following phenomena.

1. The onset is definite and often acute.
2. The lesion is usually situated in the infraclavicular region, but may be in the mid-zone or basal area.
3. The skiagrams show a very definite, characteristic picture.

To these cases Redecker gave the name "early infiltration." (Frühinfiltrat.)

The following series of cases from the City of London Hospital for Diseases of the Heart and Lungs are illustrations of "early infiltration."

CASE 1.—A man, aged 28, had been quite well until two weeks before admission, when he noticed a cough, and a few days before admission he had had a hæmoptysis of half a drachm. He was well nourished with a good colour. His temperature was 99·4° F. The only physical sign was an occasional crepitation after coughing in the left second space. The family history was negative. The sputum was T.B. positive.

CASE 2.—A youth, aged 18, had pain in the left axilla one month before admission, and cough started. After a few days the axillary pain disappeared, and cough continued. He was rather pale, but his general condition was good. There was slight impairment of note, and post-tussic crepitation in the left axilla, the temperature during the first two weeks in hospital not rising above 99·8°. The sputum was T.B. positive. The skiagram showed in the left infraclavicular region an area of infiltration which had reached the size of a large orange.

CASE 3.—A man, aged 26, developed cough one month before admission. One day before admission he had a hæmoptysis of two ounces. He was pale, but his general condition was good. There was slight impairment of percussion note over the left second and third spaces and crepitation beneath the right clavicle. There was no alteration in the breath sounds. Pyrexia was remittent up to 101°. The sputum was T.B. positive. The patient had been in close contact with an open case. Skiagrams show a definite infiltration in the right axillary region.

CASE 4.—A girl of 19, three weeks before admission had "influenza"—i.e., cough, feverishness, and malaise. These symptoms continued until admission. She had been examined nine months before as a tuberculous contact, and no physical signs had been found. Two brothers were suffering from pulmonary tuberculosis. She was well nourished with a good colour. There was an impaired percussion note in the left axilla and left interscapular region. Crepitations were heard in these regions. She showed intermittent pyrexia up to 100° during the first two weeks in hospital. The sputum was T.B. positive. The skiagram shows an area of infiltration in the left axillary region.

CASE 5.—A man, aged 28, had had "influenza" nine weeks before admission. Cough continued up to the time of admission. The general condition was good. There was an impaired percussion note over the right apical region and crepitation in this region in front and behind. The sputum was T.B. positive, and there was intermittent pyrexia up to 100°. There was no family history. Skiagrams show a large area of infiltration extending from the clavicle to the third intercostal space.

CASE 6.—A girl, aged 14½ years, had an acute cold in the head three months before admission. Cough and malaise developed later, and she lost a little weight. She was a pale, ill-looking girl, but well nourished. There was an impaired percussion note and crepitations in the right infraclavicular region, and a temperature ranging up to 99·8°. The sputum was T.B. positive. Skiagrams show an area of infiltration, which is proceeding to cavitation, in the right infraclavicular region.

CASE 7.—A man, aged 23, 28 days before admission had "influenza." He was in bed for a few days and returned to business after 14 days. He was examined by the medical officer of his firm, who sent him to hospital for investigation. His general condition was excellent, but the percussion note was impaired, crepitations were heard below the right clavicle, and the sputum was T.B. positive. There was no history of contact. Skiagrams show a large area of infiltration in the right infraclavicular region.

CASE 8.—A girl of 19, two months before admission had a "feverish cold." She showed crepitation over the right upper lobe in front and her sputum was T.B. positive.

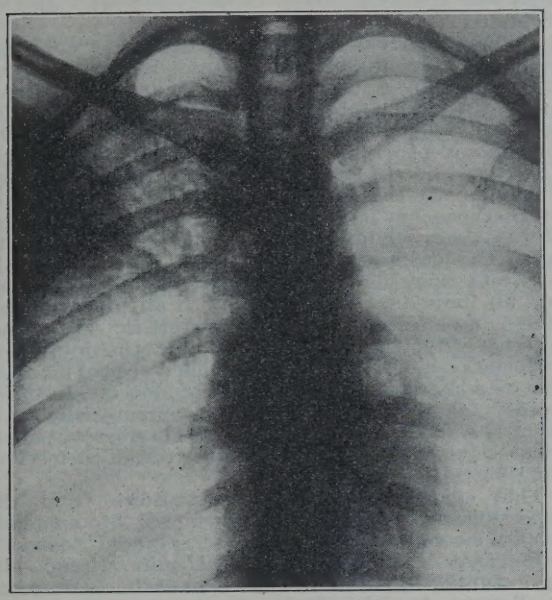
There was no history of contact. Fig. 1 shows a large area of infiltration.

The salient points in these cases are:—

1. The onset is definite, often with an acute febrile illness which may be misdiagnosed as "influenza." (Lydtin, Fassbender, and Braeuning stress the possibility of the confusion which may arise between influenza and these cases.)

2. The physical signs are present below the clavicle, usually in the second or third space, or

FIG. 1.



Radiographic appearances in Case 8.

in the upper part of the axilla, the only constant physical sign being crepitations.

3. The definite radiological appearance is of an area of infiltration, which varies in size from 2 to 10 cm. or more in diameter, the area of infiltration being situated in the infraclavicular or axillary region.

4. The general condition of most of the patients is extremely good.

It might be suggested that the lesion here described is the acute broncho-pneumonic phthisis which has long been known as a clinical picture, but that is not so. In the first place, the patient with acute broncho-pneumonic phthisis is extremely ill, while the patient with "early infiltration" is not. The skiagram of "early infiltration" in the stage described is very different from that of acute broncho-pneumonic phthisis, but if the early infiltration has advanced to evolve the greater portion of the lobe, then the skiagrams may be similar. Lastly, acute broncho-pneumonic phthisis is usually fatal, while early infiltration is seldom fatal and often, when treated, improves and heals (Assmann, Redecker, Lydtin, Ulrici).

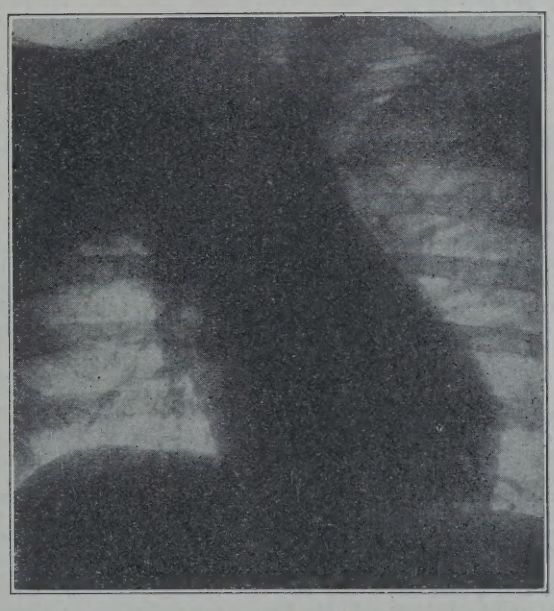
On the other hand, it might be suggested that "early infiltrations" are a particular type of pulmonary tuberculosis and have no bearing on the development of phthisis. Cases of early infiltration have been observed over a period of time and many have been seen to progress to a picture which is indistinguishable from phthisis (Redecker, Frischbier and Bechmann, Morlock [11]). It is not my intention to describe the various courses which early infiltration is known to take (a full account is given by Lydtin, Redecker, and Morlock), but to show the importance of recognising this lesion as the beginning of pulmonary tuberculosis.

The question may be asked: if "early infiltration" is really the beginning of pulmonary tuberculosis, why is it not seen more often? In the first place, like every other clinical picture in medicine, until the condition is known it is not looked for; but since the condition was first described by Assmann many series have been reported. In reviewing the skiagrams of some four hundred cases which have been treated at the City of London Hospital in the past two years, I was able to find just over fifty cases which had undoubtedly started as an early infiltration. Secondly, it must be remembered that early infiltration is a transitory lesion. In a few weeks it may spread to involve the apical region as well or it may heal in a few months to leave only a scar. If it has spread to involve the apical region before the case has come under observation, it is impossible to say if the lesion started in the apical region and spread down, or if it started as an infraclavicular "early infiltration" and progressed to the apical region.

CASE 9.—A woman, aged 25 years, three months before admission, after the birth of a child, had noticed a cough and felt ill. Cough and malaise continued up to the time of admission. Her general condition was fair. There was an impaired percussion note over the right apex in front and behind the infraclavicular region, crepitations in these areas, with slight intermittent pyrexia. There was no family history. Fig. 2 shows a lesion involving the right apical and infraclavicular regions.

When a case has reached this stage, is there any evidence to suggest which of the two processes have been at work: (*a*) early infiltration with its rapid spread or (*b*) the slowly progressive lesion, spreading from the apical region? If the latter process is the cause it would be reasonable to expect that the patient would give a history of cough and malaise extending over a considerable time. Yet in the majority of cases of this extent the patient only gives a short history (8–12 weeks). The clinician, because he believes pulmonary tuber-

FIG. 2.



Radiographic appearances in Case 9.

culosis to be a slowly progressive disease, discredits the patient's history and ante-dates the commencement of the infection, although it is well recognised that as large an area of lung can be involved in a broncho-pneumonic spread in as short a period—e.g., the broncho-pneumonic spread in the "sound lung" in case treated with artificial pneumothorax (Landreth and Morlock [12]). Therefore, it seems reasonable to suggest that, in those cases which give a short history, the initial lesion may have been this rapidly-spreading "early infiltration" which has spread to involve the apical region. Over a period of seven years

Braeuning, Lydtin, Redecker and Walter, and Kayer-Petersen, followed up series of "apical phthisis," some treated, others untreated.

—	Cases.	Progressive.	Per cent.
Braeuning	165	12	7·2
Lydtin..	450	31	7·0
Redecker and Walker	144	8	7·0
Kayer-Petersen ..	679	51	7·6
Total	1438	102	7·0

These figures show that only 7 per cent. of "apical phthises" became progressive pulmonary tuberculosis. This suggests that the spread from the apical region is uncommon. So far there are no figures to show how often "early infiltration" spreads to involve the apical region, but the facts known—i.e., (1) that the early infiltration is a rapidly progressing lesion, and (2) that many cases of extensive unilateral pulmonary tuberculosis give a short history—suggest that these cases have started as an "early infiltration," which is usually found in the infraclavicular region.

My best thanks are due to the honorary staff of the City of London Hospital for Diseases of the Heart and Lungs, for their kind permission to use these notes and diagrams of their cases.

Bibliography.

1. Assmann, H.: Beit. z. Klin. d. Tuberk, 1924, lx., 527.
2. Redecker, F.: Ibid., 1924, lix., 591; 1925, lxiii., 574.
3. Lydtin, K.: Zeit. f. Tuberk., 1926, xlv., 273.
4. Fassbender, F. R.: Ibid., 1925, xliv., 45.
5. Braeuning, H.: Ibid., 1928, li., 1.
6. Kayer-Petersen, J. E.: Münch. med. Woch., 1919, xlix., 1261.
7. Ulrici, H.: Beit. z. Klin. d. Tuberk., 1928, lxx., 171.
8. Gran, A.: Ibid., 1927, lxv., 461.
9. Rist, E., and Amenille, P.: Paris Méd., 1922, xii., 14.
10. Frischbier, G., and Bechmann, H.: Zeit. f. Tuberk., 1928, ii., 141.
11. Morlock, H. V.: Tubercle, 1929, xi., 267.
12. Landreth, J. F., and Morlock: Ibid., 1928, x., 101.

"EPIDEMIC HICCUP."

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THE occurrence of a number of cases of epidemic hiccup in this country during the first two months of the present year may make the following communication of interest, inasmuch as the malady is of comparatively recent recognition and perplexing to those who encounter it for the first time.

Symptomatology.—On Jan. 31st, 1929, at the request of Dr. Crewdson Thomas, I saw A. B., aged 57, a retired Army officer.

On Jan. 25th, after a journey to Liverpool, he contracted a cold and felt feverish and ill. He went to his office in the city on the 28th, but returned home at midday with a temperature of 100·2° F. Dr. Thomas saw him and ordered him to bed. On the following day the patient began to hiccup. The hiccuping was almost incessant; at intervals short intermissions occurred in which the patient lay back on his pillow in an exhausted condition. The attack lasted two and a half days and left the victim extremely weak. The pulse was slow, 55; the knee-jerks slightly exaggerated. There were no other signs on physical examination, except those of nasopharyngeal catarrh which rapidly cleared. The patient informed me that he had suffered from a similar attack, but of slighter severity, seven years previously.

This is a description of a fairly typical case of epidemic hiccup. The illness begins with a mild feverish attack of nasopharyngeal catarrh which may simulate "influenza" or a "cold in the head." There is usually some elevation of temperature and the pulse-rate is slowed. From 25 to 48 hours after the onset the patient is suddenly seized with a persistent rhythmic hiccup which continues incessantly all day, interferes with talking and eating, occasionally causes vomiting, and ceases only when the patient succeeds in obtaining sleep. The cerebro-spinal fluid is normal. The illness is usually mild although its subjects naturally suffer much inconvenience and some mental anxiety. The duration is usually from 24 hours to two or three days; the attack may last as long as a week, and Economo has described an exceptional case which endured for a whole month, the patient having only a few hours' respite each day. The nasopharyngeal catarrh subsides with the cessation of the characteristic attacks of hiccup. As a rule, there is complete recovery from the attack and an absence of complications or sequelæ. Courtois Suffit, however, in 1920 had under observation a patient suffering solely from hiccup who died in 48 hours.

One may fairly describe a case as one of "epidemic hiccup" from its clinical characters, just as one may diagnose a case of "epidemic encephalitis" without necessarily having evidence, in the particular instance, of a chain of infection, or even of the incidence of other similar cases in the neighbourhood. The conception of epidemic hiccup, epidemiologically, is similar to that of various epidemic diseases of the nervous system; thus while associated groups of cases or definite epidemics sometimes come to light, the ordinary train of evidence is that only here and there does the widespread infecting agent find an individual who reacts with an unmistakable illness manifested by a characteristic syndrome. Alternatively, the agent may infect the individual with such a massive dose, or in such a special manner, that the characteristic illness is produced. In other words, for every definite and characteristic case there is a large and indeterminate number of people who receive and carry the infection without themselves suffering noticeably, or at all.

This epidemiological concept results from the experience of previous appearances of epidemic hiccup, as well as of apparently "sporadic" cases.

Previous Appearances of Epidemic Hiccup.—In the autumn of 1919 small outbreaks of illness occurred in Egypt, Austria, Italy, Germany, and Canada in which hiccup, sometimes associated with fever, was the predominant symptom. An outbreak occurred in Vienna in January, 1920, and was described by Economo.[1] In the same month small epidemics were seen also in France[2] and in Switzerland. In December epidemic hiccup was common in Paris, and it was estimated that there were 5000 cases in the city. Railliet saw 130 cases in November and December in Rheims, and an epidemic which is said to have affected 500 persons occurred in the Bernese Jura in December and January, 1921. The disease was made notifiable in Switzerland, where 64 cases were notified. A few cases were reported in Canada, Australia, the United States, Denmark, and Norway.

In December, 1920, the disease was first noted in England, in London, Birmingham, Maidenhead, Oxford, Abingdon, and elsewhere. On behalf of the Ministry of Health I inquired into a group of 12 cases which occurred among the out-patients at Charing Cross Hospital.[3] None of these cases returned for treatment, which suggested that the attack was not one of long duration.

Since 1920 attacks of epidemic hiccup have occurred in the winter months of the year. In the first quarter of 1924, when encephalitis lethargica was prevalent, epidemic hiccup was widespread.

Age and Sex.—No complete statistical figures are available, but clinical experience and published reports lead one to the belief that males over 40 years of age are usually the subjects of the malady. In the Rheims outbreak it was definitely stated that children were not affected.

Infectivity.—Epidemic hiccup is an infectious disease although the degree of infectivity is not high. In two instances in Paris two bank clerks occupying the same desk were almost simultaneously affected. In the London outbreak of 1920 the casualty medical officer of Charing Cross Hospital apparently contracted the disease from his patients. Several

instances of multiple cases of epidemic hiccup in households were seen in 1924.

Relation to Encephalitis Lethargica.—Economo[4] recorded hiccup as a complication of encephalitis lethargica in 1917, and I noted it in five of my series of cases in 1918.[5] About a month after the first appearance of epidemic hiccup in Vienna (1919–20) a myoclonic form of encephalitis was seen in which clonic convulsions and hiccup were followed by choreic movements. Economo wrote at that date:—

"It is not possible to say that the epidemic of hiccup was already a precursor of this encephalitis with a particular localisation in the region of the phrenic vagus, but future observations on the possible relationship will be worth noting."

Staehelin[6] reporting on an epidemic at Gerlafingen in Switzerland, states that the sequence of events was first an epidemic of transitory ocular paralyses, then an epidemic of hiccup, and finally many cases of epidemic encephalitis. From observations on French cases Dufour,[7] Renard and Netter[8] definitely considered that epidemic hiccup is a masked form of encephalitis lethargica.

The English experience is in accordance with this view. The late Dr. Farrar reported the following instance of probable association between epidemic hiccup and encephalitis lethargica at Birmingham.

"Mr. P., senior, aged 65, visited his son, Mr. G. P., aged 36, on Dec. 16th, 1920. Between Dec. 20th and 25th, Mr. P., senior, had a violent paroxysmal hiccup which lasted a week and left him quite exhausted. On Dec. 27th—i.e., 11 days after seeing his father—Mr. G. P. developed typical encephalitis lethargica with myoclonic twitchings, but no hiccup. On Jan. 6th, 1921, Mr. G. P. was visited by his brother, Captain P., and assisted to fit a water-bed. A few days later Captain P. had a severe attack of hiccup lasting for four days."

In the widespread epidemic of encephalitis lethargica in 1924, in which 5039 cases with 1419 deaths were recorded in England and Wales, epidemic hiccup was also widely prevalent and was seen in definite association, for instance in the same household, with encephalitis lethargica. Sir John Robertson, then medical officer of health for Birmingham, from his experience in the Birmingham epidemic, was strongly of opinion that epidemic hiccup may be a symptom of encephalitis of a mild type. There is therefore good reason in view of the cumulative evidence for regarding epidemic hiccup as a mild or frustrated form of encephalitis lethargica. If the identity of the two forms of disease is accepted, although the illness is temporarily exhausting and distressing, the speedy recovery and the absence of after-effects decidedly make epidemic hiccup the form of encephalitis lethargica which it is most desirable to suffer from.

Diagnosis.—The causes of persistent hiccup are manifold, but the association of hiccup of sudden onset with an elevation of temperature, antecedent nasopharyngeal catarrh, and frequently a slowed pulse-rate makes the disease usually quite recognisable. Subdiaphragmatic conditions, pleural and phrenic irritation by new growths, and central causes have to be excluded. Of central causes the persistent hiccup of uræmia and that due to cerebral irritation set up by a tumour or hæmorrhage may be instanced. It must not be forgotten that epidemic hiccup is most likely to be mistaken for the hiccup which is a pure functional manifestation, especially when the patient is a nervous individual.

Treatment.—C. F. T. East[9] gives a long list of remedies for persistent hiccup. In practice it is usually found that epidemic hiccup must run its course, and that attention has to be devoted to making the patient as comfortable as possible, and to assuring him that the attack, although troublesome, is not dangerous and will be of short duration.

In the severe cases the patient should be confined to bed. Sedatives, such as bromides, may be given, and occasionally relief is experienced when belladonna or cajuput oil is administered; if the paroxysms of hiccuping greatly distress the patient and prevent him from sleeping, morphia combined with atropine may be efficacious in steering him through the illness.

References.

1. Economo, C.: Archives Suisses de Neurol., 1920, vi., fasc. 2, 276.
2. Logre, and Heuyer, G.: Gaz. des Hôp., 1920, xviii.
3. Ann. Rep. of the Chief Medical Officer of the Ministry of Health for the Year 1920, H.M. Stationery Office, 1921, Cmd. 1397, p. 65.
4. Economo: Wien. klin. Woch., 1917, xxx., 581.
5. MacNalty, A. S.: Report of an Inquiry into an Obscure Disease, Encephalitis Lethargica: Reps. to Local Govt. Board on Public Health and Med. Subjects (N.S., No. 121), 1918, p.
6. Staehelin, R.: Encephalitis epidemica. Vortrag auf der Wandervers Sedwestdent Neurolog. Irrenärzte Baden-Baden, June, 1920.
7. Dufour, H.: Bull. de la Soc. Méd. des Hôp. de Paris, Jan. 30th, 1920,
8. Lafosse, Netter, Rivet, and Leri: Presse Méd., 1920, p. 930.
9. East, C. F. T.: THE LANCET, 1926, ii., 140.

Clinical and Laboratory Notes.

A CONGENITAL SOLITARY KIDNEY.

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CONGENITAL absence of one kidney is uncommon, the incidence at autopsy being about 1 in 1610 cases, according to the most recent figures of Campbell.[1] About 400 cases have been reported in all; 286 were described before 1910, since when Anders [2] has added 61, Eisendrath[3] 25, and Campbell[4] 9. The condition is generally found at post-mortem examination, but 34 clinical cases have been collected, only some of which have been confirmed by subsequent autopsy. In Campbell's series the youngest patient was 5 days, and the oldest 60 years of age.

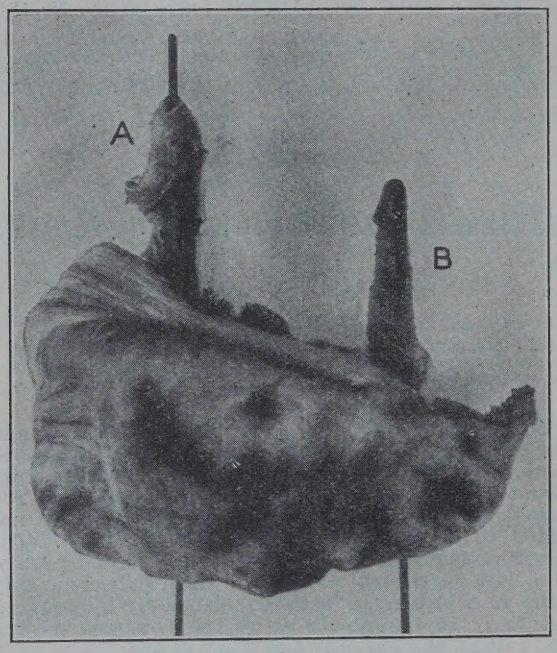
The single kidney is most often the right, and its form varies little from the normal except when it is ectopic. It is often hypertrophic, sometimes normal in size, and in about 5 per cent. of cases very small.[5] The course and ending of the ureter of the solitary kidney may vary from the normal; in some cases it opens in the midline of the bladder, and, rarely, crosses the midline to end in the opposite side of the bladder (Eisendrath). The ureter on the opposite side to the one where the solitary kidney is situated is generally absent, but may vary from a shallow pouch or cul-de-sac to one which is patent for about half the length of the normal ureter. Among 61 cases, Anders[2] found a more or less patent ureter in 10; Winter[5] found this in 18 cases out of 237; and Eisendrath quotes three cases in which the ureter was patent for 1 cm., 8 cm., and 3 cm. respectively, and also Thevenot's case where it was patent for 15·2 cm.—i.e., for half its normal length. Instead of the rudimentary ureter ending at the normal ureteral orifice, however, abnormal extra-vesical endings may be met with. Papin[6] quotes five cases in which there was reduplication of the pelves and ureters of the solitary kidney. The adrenal is sometimes absent on the involved side. Various associated genital defects are occasionally met with—for example, unilateral absence of seminal vesicle or vas deferens, abnormality or absence of uterus, or rudimentary development of vagina. The solitary organ is said to be specially liable to be attacked by disease. Hannay and Young reported a case of carcinoma of a solitary kidney.[7]

The fact that the condition is rarely discovered before death, especially by exploratory laparotomy, prompts me to record this additional case, which has features of much interest.

The Case Described.

A married woman, aged 25 years, was admitted to the Royal Alexandra Infirmary, Paisley, under the care of Mr. Hugh Donald, and complained of severe pain of 24 hours' duration in the right side of the abdomen. She stated that

five days before admission she had had an attack of shivering, felt out of sorts, and had some pain and tenderness in her "appendix region." She remained in bed and the pain passed off until the onset of the severe attack, which compelled her to send for the family doctor, who diagnosed the condition as "appendix abscess." For about six years previously she had had occasional attacks of right-sided pain, accompanied by nausea and vomiting, and always relieved by lying down. For as long as she could remember she had had frequency of micturition, but had never complained of it.



Interior of the bladder with probes in the ureteric orifices. A=right ureter. B=left ureter (blind).

On admission her temperature was 103·8° F., pulse-rate 144, and respiration-rate 24. A large tumour was definitely palpable and tender to the right of the umbilicus, and extended from about an inch above the umbilicus to almost the level of the anterior superior iliac spine. There was very great tenderness over McBurney's point. Examination of urine showed a specific gravity of 1018, a neutral reaction, and the presence of distinct albumin, pus, and blood. The diagnosis of large appendix abscess was questioned, but it was decided to do a laparotomy. The abdomen was opened through a right rectus incision, and the tumour was found to be a large distended right kidney sac. The left kidney was then sought—a comparatively easy procedure through this incision—but to our great surprise could not be found. Its absence was corroborated by the assistant surgeon. The right renal pelvis was aspirated at two separate points but no purulent fluid was obtained. It was not deemed advisable to interfere further, and the abdomen was closed.

In the succeeding 24 hours the patient passed 4 oz. of urine, and in the next day 6 oz. Forty-eight hours after operation she was catheterised, but no urine was obtained from the bladder, and there was complete anuria until death, which occurred 66 hours after operation. Two hours before death 1½ oz. of pus was passed per urethram. Post-mortem, catheterisation failed to find urine in the bladder. The post-operation urine was examined by the pathologist to the infirmary, Dr. M. B. Hannay, who also conducted the post-mortem examination.

Report on urine.—Amber, very turbid, alkaline, specific gravity 1010. A very large amount of albumin (1·8 per cent.) is present. The cell deposit is very large in amount and consists of pus. Microscopically, in addition to pus, there are frequent red blood cells and a few epithelial cells and micro-organisms. A Gram film shows numerous coliform bacilli, and culture gives a growth of *Bacillus coli*.

Post-mortem report.—The right kidney weighs 23 oz., and is displaced downwards. It measures 6½ by 3 by 2¾ in., and is thus greatly enlarged (normal is about 4 by 2½ by 1½ in.). It is very soft, and shows areas of congestion. The renal pelvis is much dilated, to the size of a hen's egg, and contains pus. The walls are not noticeably thickened. The right ureter is thin-walled and dilated below. At the upper end, which is of the normal width, there is a kink caused by the dropping of the enlarged kidney. There is no trace of the left kidney. The left ureter ends blindly, 2½ in. (6·3 cm.) from the bladder. There is no scar in the left loin. Both adrenals are present and normal. There are no genital defects. The cause of death is acute cystitis and pyelonephritis.

The photograph shows the interior of the bladder with probes in the ureteral orifices, the one on the left side passing up the right ureter, which has been cut across, and the one on the right side lying in the blindly ending rudimentary left ureter.

Comment.

The only case found in the literature resembling this is that of Winter,[5] in which the pre-operative findings were "sudden onset, large right abdominal tumour, and no cystoscopy. Exploratory operation revealed a large cystic kidney, which was removed. Autopsy five days after operation revealed a left ureter 8 cm. long, ending normally below, but blindly above. The left kidney was absent."

There are six instances in the literature, quoted by Eisendrath,[3] of congenital single kidney in which nephrectomy was performed on the solitary kidney, unwittingly, for tumour, severe renal infection, or tuberculosis.

My case is a warning to all who contemplate any kind of surgical interference in renal disease without catheterisation of the ureters. The possibility of unilateral kidney should be kept in the forefront of a surgeon's thoughts when called to perform a nephrectomy, especially when the loin incision is employed. It should be a rule never to remove a kidney without previously having made certain of the presence of a second and, apart from opening the abdominal cavity, the only method is by pyelography. This is Galbraith's[8] view, and he adds that cystoscopy showing the normal excretion of indigo-carmine from a normally placed ureter may be fallacious. Russell Howard[9] states that if one kidney is absent the opening of the ureter into the bladder is also absent, and the condition may be recognised on cystoscopic examination. This is erroneous, as is the similar statement of Thomson and Miles[10] that congenital absence of one kidney presents, on cystoscopic examination, only one ureteral orifice.

The appearance of two normally situated ureteral orifices on cystoscopy is not necessarily indicative of the presence of two kidneys, as my case of patent rudimentary ureter emphasises.

I wish to thank Mr. Hugh Donald for permission to publish this case, and Dr. Mary B. Hannay, to whom I am indebted for the pathological reports and photograph.

References.

1. Campbell, M. F.: Annals of Surg., 1928, lxxxviii., 1039.
2. Anders: Amer. Jour. Med. Sci., 1910, cxxxix., 313.
3. Eisendrath: Annals of Surg., 1924, lxxix., 206.
4. Campbell: Loc. cit.
5. Winter: Arch. Klin. Chir., 1903, lxix., 611. Quoted by Eisendrath.[3]
6. Papin, E.: Encycl. Franc. d'Urol., 1914, iii., 246.
7. Hannay, M. B., and Young, R. F.: Brit. Jour. Surgery, 1924, xi., 1927–28.
8. Galbraith, W. W.: Trans. Roy. Med.-Chir. Soc., Glasg., 1927–28. xxii., 93.
9. Howard, Russell: Practice of Surgery, London, 1924, p. 1127
10. Thomson and Miles: Manual of Surgery, 1926, iii., 365.

HYPOPYON ULCER OF THE CORNEA.

A BRIEF REVIEW OF ONE HUNDRED CONSECUTIVE CASES.

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THE object of this article is threefold: (*a*) To impress on the practitioner that any corneal ulcer with pus in the anterior chamber is threatening an eye; (*b*) to supply figures for comparison with new methods of treatment; and (*c*) to commend early opening of the anterior chamber by a special incision.

These ulcers vary much in severity in different countries and in different parts of the same country. Of my cases 60 were miners working below ground;

these represent a type generally severe. In only one case—and he not a miner—was a foreign body present in the ulcer. I have not known such an ulcer to follow extraction of a foreign body in our casualty department where we deal with some 2800 foreign bodies per annum. Nine cases were women; only one was a child, aged 2, which cleared well with lotion and atropine only. Several cases presenting late or in debilitated or aged persons were doomed from the start, but these have been included, though for statistical purposes they are not of much value. The 100 cases range over six years and all were hospital cases.

Methods of Treatment.

Treatment has varied somewhat, but the following methods have been tried out and are now more or less stereotyped as follows: (*a*) Rest in bed, as flat on the back as possible, for at least 5 days and often for 15. Too early assumption of the erect posture, and too prompt dismissal from the ward, has been too often followed by recurrence. (*b*) Atropine drops and frequent lustrations even to the intensive half-hourly method recently advocated, if this can be carried out. (*c*) A search is made for septic foci elsewhere—e.g., teeth and tear sac—and, if possible, these are dealt with. (*d*) Carbolisation with pure carbolic unless the cornea is deeply infiltrated. If the case is only seen after the fifth day this often does more harm than good. Actual cautery, even by chauffage, I have found to produce a very dense but soft scar; but I confess to not having adopted the carefully graduated method of Mr. Edgar Stevenson, of Liverpool. (*e*) General tonic treatment, and more recently sodium salicylate intravenously. (*f*) Section. As it is more especially this last I wish to advocate, I shall briefly describe my method.

Under (local anæsthetic) cocaine a small keratome incision just inside the limbus is made in lower part of the cornea into the anterior chamber. A modified Usher's spatula is then introduced, and on to it with a special semi-circular knife (like an old-fashioned vaccination lancet) a vertical incision is made through the corneal substance, thus completing an inverted T. Both instruments are made by Messrs. Down Bros. and Weiss and Son. The first incision is best done facing the patient, the second from behind. Thus the lens is protected and complete control of the eye obtained by the spatula. The second incision may require two or three to and fro movements of the knife, but may be done by one sweep from centre to periphery. The advantage of this incision is not only its completeness but its accessibility for subsequent tappings if deemed necessary. The point of the crossing is easily made out even weeks after, and I have with the greatest ease broken in with a blunt instrument 12 days after the original incision. Evacuation of the pus is not essential; it sometimes flows freely, at others is sticky and thick. It should not perhaps be left in the wound as it is then likely to act as a wick to introduce infection. One, two, or more subsequent tappings at intervals of two or three days may be indicated.

Results of Early Section.

Results of treatment may be considered statistically, but if so, great reserves must be made as there are many varying factors.[1] Thus 63 of my cases were sectioned, but I do not advocate section in every case, though I have never regretted an early section. And the fact that of 37 cases not sectioned 30 did well—result "good" or "fair"—does not prove anything against section, because most of these cases were of a mild type. Of the 37 non-sectioned cases 27 were good, 3 were fair, 7 were bad, and none was "lost." Six of the bad were cautery cases which perforated.

My sectioned cases fall into two groups—(*a*) those done before the fourteenth day from the date of onset, usually a trauma; (*b*) those on the fifteenth day or later. Of (*a*) 3 were lost, 11 bad, 5 fair, 14 good, total 33. Of (*b*) 6 were lost, 12 bad, 5 fair, 7 good, total 30. Thus 9 eyes out of the 100 were lost; but statistics of removal depend largely on the personal factor. I endeavour to retain an eye if it has only P.L. (perception of light) and is not painful. Unsightliness does not weigh heavily.

The better results of the early-sectioned cases are enhanced by a closer study of the failures, but space does not allow of that here. In two of these latter the damage seemed to be done by a plastic iritis quite different from the simpler cyclitic hypopyon. All other methods of treatment seem ineffectual in such cases, and section is the only means I know of that has in one or two caused definite arrest of the process, even when done late.

But the time factor is not everything. Some cases, for example, show very extensive or deep ulcer only three or four days after onset; these are virulent, but many of these may be saved by prompt section. On the other hand, a fair proportion of late cases that had run a mild but chronic course were sectioned after all other means had failed, and this brought about definite arrest with a good visual or scar result.

The terror of the Guthrie-Saemisch section with its adherent iris is done away with by this innocuous yet efficient section. An adherent iris is a rarity and usually due to an error in technique or the presence of a plastic iritis that would have blocked the pupil in any case. In only five cases of the series did lens opacity result. In two of these the patient jibbed badly, and it is possible that with the dilated pupil of atropine the point of the keratome may have touched the lens. I think, however, that the presence of semi-solid pus lying for weeks, it may be, on a segment of iris and lens, may in itself, apart from any error in technique, cause some localised lens opacity that may later involve the whole lens.

Finally, I would urge that it is not on account of plus tension that section is undertaken. Renewal of aqueous is the vital necessity. A by-effect may be the lowered corneal tension allowing healing lymph to pass more freely through the corneal tissue. The two flaps of the section have at times been noted as definitely œdematous. Plus tension may occur, but in my experience is a late phenomenon. Two of my obstinate cases had a definitely minus tension—one was sectioned, the other not; both did well.

Can one, then, lay down a definite line of treatment in hypopyon ulcer? I am afraid not. The cases are polymorphic. Space does not permit a closer analysis of types. No allusion has been made, for instance, to the diplobacillary type to which two in my series seemed to belong. Whether localised ultra-violet rays will replace present methods remains to be seen. London and Toronto statistics of hypopyon ulcer must be accepted with caution. A total of 48 "good" results in these 100 cases, of which 21 were sectioned and 27 not, may or may not be regarded as satisfactory.

[1] Results from the visual and scarring point of view may be tabulated as: "good" = 6/6 to 6/18 or very slight scar; "fair" = 6/18 to 6/60 with denser scar; "bad" = less than 6/60 or very dense scar; and "loss of eye" cases.

AN UNCOMMON ABDOMINAL CYST IN A YOUNG CHILD.

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THE comparative rarity of cysts of the omentum encourages me to record a case which has recently passed through my hands. The only detailed account of omental cysts I have been able to find is in Keen's "Surgery" (Vol. IV., pp. 632 and 633). Here it is stated that cysts of the omentum are most frequently seen in children under 10 years of age, 50 per cent. being under 10, and 65 per cent. under 20 years of age; 75 per cent. of cases occur in females.

The patient was a healthy boy of 4, who had had an uneventful medical history. His parents were both healthy, and he had been perfectly fit until a fortnight before I saw

him. His mother had then observed a swelling of the lower abdomen which had rapidly increased in size, and she had called in Dr. Hugh John of Llangennech to see him. While attended by Dr. John, the boy had complained of vague abdominal discomfort. On one or two occasions there had been a rise of temperature to 100° F., and on one occasion a little blood had been passed in the urine.

Dr. John asked me to see the boy with him on April 7th. I found a slightly-built, well-nourished boy, who complained of slight abdominal discomfort. The abdomen was much swollen in the lower part. The pulse and temperature were normal. A hard tumour was felt, filling the abdomen below the umbilicus. The bladder was empty, and there was a distinct gap between the tumour and the pubes. The tumour seemed to fill up the pelvis. There was no distension of the abdominal veins. In view of the rapid growth it was thought that the condition might be due to a malignant growth of the kidney (particularly in view of the history of hæmaturia on one occasion). Encysted tuberculous ascites was also considered, as were retroperitoneal growth and various congenital cystic conditions. Laparotomy was advised and later performed under general anæsthesia.

The abdomen was opened by a mid-line incision, extending from the umbilicus to the pubes. On opening the peritoneum a large mass was seen, adherent by very easily separated adhesions to the peritoneum of the anterior abdominal wall. After separating the adhesions, the tumour was found firmly adherent to the omentum. The attached omentum was clamped and ligated, and the tumour found almost completely to fill the pelvis. So slight were the adhesions to the peritoneum of the pelvic floor that during the process of examining the posterior attachments of the growth the tumour separated away completely from them, leaving a few very small bleeding points, none of which needed ligation. The abdomen was closed and the wound healed by primary union, the patient leaving hospital 12 days later.

The tumour was about the size of the head of a six-months-old child. It was polycystic, and attached to it were several smaller cysts. All the cysts were opened and were found to contain a clear substance, of the consistency of jelly which had only partially set, and a certain amount of fluid like blood serum. There was no blood. The cyst wall was sent to Dr. S. C. Dyke, consulting pathologist, the Royal Hospital, Wolverhampton, who has sent me the following report:—

"The portion of cyst wall consists of fibrous tissue only. This fibrous tissue is very dense in some parts; in others the cells are vegetative in type and show evidence of rapid recent growth. The fibrous tissue contains well-formed blood-vessels and some included groups of fat cells. Inflammatory cells are present but not in very large numbers, certainly not in sufficiently large numbers to suggest an inflammatory origin for the cyst. These cells are of all types: polymorphonuclear leucocytes, eosinophiles, and plasma cells. There are also a few collections of large mononuclear cells apparently derived from the lining of the omentum. I think it is possible to say with certainty that this cyst is not neoplastic, and there appears to be no reason why it should recur after having been completely removed. It can only be described as an omental cyst. Such cysts are rare but they do occur. On preliminary examination of the specimen my first impression was that you had sent me the wall of an hydatid cyst. The specimen would pass as the ectocyst, but there is no trace of endocyst. This lies under the ectocyst and is translucent and gelatinous. I presume that I am justified in believing that no such endocyst existed. I think you are justified in telling the relatives that it will not recur. Certainly it is not malignant."

The chief interest in this case lies in the fact that the condition is rare, and does not seem to attract the attention it should in the differential diagnosis of abdominal tumours in children. In the case described there was no endocyst, and it will be interesting, in view of Dr. Dyke's report, to follow the future medical history of this child. The condition can, I think, only be diagnosed definitely by laparotomy, but it seems to me one which must be thought of in the diagnosis of abdominal swellings in children.

BIRMINGHAM HOSPITAL SATURDAY FUND.—During the first half of the present year 4500 employees of 285 contributing firms have joined the Fund, and £20,000 has been handed to the contributory scheme as against £15,000 for the corresponding quarter last year. The convalescent home accommodation of the Fund is so seriously overtaxed that there is a waiting-list of 1146 cases. There is still a debt of about £27,000 upon the building fund of the Tyn-y-Coed Home, and a large number of firms are subscribing an additional penny per head per week towards reducing it.

Medical Societies.

PATHOLOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND.

A MEETING was held in the new institute of pathology in Tennis Court-road, Cambridge, on July 5th and 6th, with Prof. H. R. DEAN, Master of Trinity Hall, in the chair.

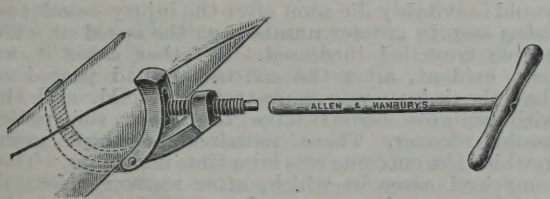
C. H. Whittle (Cambridge) in the course of many tests of pneumococci on mice had found that about 2 per cent. of the animals developed a pneumococcal otitis media with rotary and other movements and might die from a secondary pneumococcal septicæmia.—A. D. Gardner (Oxford) had watched the multiplication of the tubercle bacillus and found that it followed ordinary lines; he saw nothing suggestive of a granule phase or any complicated life-history.—F. W. Andrewes (London) noted that a few strains of hæmolytic streptococci actively fermented starch and gave an elegant demonstration of the reaction.—T. J. Mackie, D. G. S. McLachlan, and E. J. N. Anderson (Edinburgh) had isolated the tetanus bacillus from a specimen of catgut supposed to be implicated in an outbreak of post-operative tetanus. Catgut artificially contaminated with spores infects guinea-pigs experimentally, the spores washed off it do not, nor do spores injected into the neighbourhood of implanted catgut. Sublethal doses of *B. welchii* make tetanus spores effective and exposure of animals to cold eight weeks after inoculation of spores may determine a fatal tetanus.—C. H. Andrewes (London) showed that virus III. developed the characteristic inclusion bodies in cultures of rabbit testis and with the same technique showed that the resistance of immunised animals depended on the blood plasma rather than the tissue cells.—S. P. Bedson (London) proved that it was possible to immunise guinea-pigs against herpes and cause the production of neutralising antibody in the blood by formalin-killed virus.—J. Craigie and W. J. Tulloch (Dundee) showed how specific and valuable was the flocculation test (rabbit immune serum and extracts of vesicles) in the differential diagnosis of small-pox and that it could not well be due to contaminating bacteria as has been supposed.—H. R. Dean, N. E. Goldsworthy, and C. TenBroeck (Cambridge) discussed the technical difficulties in measuring the rate of disappearance of horse serum injected into the blood of rabbits.—W. W. C. Topley and G. S. Wilson (London) starting with Schütze's discovery that *B. pseudotuberculosis* and *B. aertrycke* had a common O heat-stable antigen failed to protect mice against *aertrycke* with pseudotubercle vaccines but got passive protection with immune rabbit sera.—J. Craigie (Dundee) detailed his experiments on the flagella and somatic antigens of the typhoid bacillus.—J. Gordon (Leeds) found that dyes of the congo-red group interfered with hæmolysis and bacteriolysis.—E. G. D. Murray (Cambridge) dealt with the technique of standardising dysentery antitoxin.—C. H. Browning and R. Gulbrausen (Glasgow) showed how the immunity developed by the stimulation of dead parasites was a factor in the curing of trypanosome infections by chemotherapeutic agents.—W. T. Hillier (Birmingham) described the determination of red cell fragility and its application in the differential diagnosis of jaundices.—J. Davidson (Edinburgh) examined the action of senecifoline (from ragwort) on the rat's liver: it causes hæmorrhage, acute necrosis, proliferation of kupffer cells, and finally in surviving animals fibrosis and cirrhosis.—J. H. Dible (Liverpool) showed that the amount of fat which accumulates in the liver during starvation depends on the abundance of storage fat in the body.—W. Cramer (London) detailed further experiments showing how the development of one tar cancer tends to inhibit the

appearance of another.—T. Hare (London) described a case of spondylitis deformans in a dog associated with advanced general arterio-sclerosis and discussed the possibility of the primary periarticular lesions being due to arteriolar damage.—Norah H. Schuster (London) dealt with the classification of lung tumours especially with the possibility of recognising those arising in the alveoli.—H. L. Sheehan (Manchester) described a remarkable cystic tumour of the liver in a child, including connective tissue, epithelial tubes, and striped muscle, and concluded that it was a mesoblastic hæmatoma in which both mesenchyme and mesothelium were represented.—J. Braxton Hicks (London) described a congenital deficiency of the œsophagus and a case in which more than 300 cysticercus cysts were found in the brain.—Among the demonstrations were the following: R. H. Morley, acute miliary tuberculosis in an infant of six weeks with older lesions in the liver suggesting intra-uterine infection; A. N. Drury (Cambridge), a substance isolated from normal heart muscle which causes experimental heart-block; E. W. Hurst (London), lesions of experimental poliomyelitis in monkeys; C. H. Whittle (Cambridge), cor bovinum in a man aged 20; Bertha Wheatley (Leeds), blastomycosis of pleura; A. L. Taylor and H. Rogers (Leeds), solitary plasma-cell myeloma of femur; A. L. Taylor (Leeds), primary sarcoma of spleen; general carcinomatosis of bones; E. G. D. Murray (Cambridge), a useful type of animal cage; R. A. Webb (Cambridge), vital staining of blood and tissue cells; J. R. M. Innes (Cambridge), (1) changes in hypervitaminosis, (2) artificial deciduomata, (3) ovarian abnormalities in rabbits.

New Inventions.

A BONE-RETAINING CLAMP.

THE instrument here illustrated is intended for use in operations upon oblique fractures of long bones, especially the femur and the humerus. The fragments are manipulated into perfect coaptation in the usual way, with long bone-holding forceps, and the encircling clamp is then applied. If the fracture be of the long, oblique variety, two can be used, and retention is then perfect without the need



of any other intervention by means of forceps, &c. The clamp has been devised to overcome some of the difficulties that are commonly met in the use of existing types. It is often found that the handles of these clamps are very much in the way in the wound; either they have to be released in order to get the plate into position or, as they can only be applied in one plane, they are not suitable for use in many cases of oblique fracture. The new clamp, the handle of which is detachable, occupies very little space in the wound and it can be applied at almost any angle, according to the direction of the fracture. Even when one only can be used, it so far steadies the fragments that they can be held firmly in position by one assistant with very little effort.

The clamp is made of stainless steel, in two sizes, by Messrs. Allen and Hanburys, Ltd., Wigmore-street, London, W.

ALAN H. TODD, M.S. Lond., F.R.C.S. Eng.

OXFORD OPHTHALMOLOGICAL CONGRESS.

DISCUSSION AT THE ANNUAL MEETING.

THE sixteenth annual meeting of this Congress was held at Oxford from July 4th to 6th, with Mr. A. BERNARD CRIDLAND, the Master, presiding. It was very largely attended.

On Thursday, after a short address of welcome by the Master, a discussion on

Diseases of the Lacrymal Apparatus

was introduced by Prof. JOSEPH MELLER (Vienna). In the course of his paper he discussed the frequency with which stenosis led to epiphora. Examination of a large number of cadavers, he said, showed that the lacrymal canaliculi were normal in only 80 per cent. It could be stated that most lacrymal passages were more or less diseased, but without conjunctivitis. Most of the subjects of diseased passages were women. X rays afforded the first means of satisfactorily seeing the normal and pathological conditions of the sac in the living person. Often, too, X rays would give an indication of the kind of operation required. Radium applied to a tuberculous condition of the tear sac gave very successful results, so that operation was rendered unnecessary. Many ophthalmologists made the mistake of regarding epiphora as synonymous with stenosis of the lacrymal duct. Slitting of the canaliculi was now less often performed than formerly; and in all cases the operator must avoid slitting the canaliculus as far as the canthus. For dilatation of the tear-duct the permanent probe treatment seemed to have been abandoned.

Turning to the local treatment of chronic dacryocystitis with more or less copious secretion Prof. Meller said the condition could occasionally be favourably influenced, even cured, by medical means. Silver nitrate in ¼ per cent. solution, applied with the syringe, seemed best. Tincture of iodine had been used for the purpose, but it caused considerable irritation of the conjunctiva. After a properly performed extirpation of the sac, the epiphora, which before the operation was copious, almost always became so slight that the majority of the patients made no further complaint of it. If, however, a small particle of mucous membrane was left behind, lacrymation continued, and might be as severe as before the operation. There had been a good deal of discussion as to whether, after the canaliculi had been slit in Toti's operation, the normal conveyance of tears was or was not restored. It was now recognised that intact canaliculi were not absolutely essential. Notwithstanding slit canaliculi, the epiphora ceased completely after the operation. Kofler's transseptal procedure had increased the view of the field of operation, so that every step of it was carried out under visual control. The operation was performed painlessly under local anæsthesia, and the results were excellent, even in elderly people. Prof. Meller advised ophthalmic surgeons, in cases of dacryocystitis in which operative interference was indicated, to extirpate the sac; a good extirpation was, he said, better than a poor dacryocystorhinostomy.

Mr. J. S. FRASER (Edinburgh) treated the subject from the standpoint of the rhinologist, entitling his paper Intranasal Dacryocystotomy. His contribution was based upon 99 patients, 90 of whom had a diseased condition on one side only. The total number of operations done on them was 108. Most of them had already been seen by an ophthalmic surgeon before they came to him. In 89 of the cases he was able to keep track of the patients subsequently, and 67 of them were regarded as completely successful—i.e., there was no recurrence of swelling in the tear sac, no pus could be squeezed out, and the eye did not water. The patients' only comment was that occasionally when they blew their noses they blew their eyes also. The most successful results were

obtained in cases in which there was a definite collection of muco-purulent fluid in the tear sac. If he had tried to get patients to undergo operation two or three times doubtless he would have obtained a better figure than 75 per cent. of cures.

Mr. T. HARRISON BUTLER (Birmingham) said he did not use a retractor when operating on these cases. He had had only four or five cases of troublesome epiphora after operating, and in most of them, on reopening the cavity, he had found a relic of mucous membrane. On removing this, the epiphora ceased. A very serious possible complication was ulceration of the cornea from accidental injury during the operation. He related two such cases.

Mr. E. D. D. DAVIS (London) gave a short review of the subject from the rhinological point of view, instancing cases in illustration, and demonstrating a series of slides.

Dr. S. H. BROWNING (London) spoke as a bacteriologist. He had a good word to say for optochin in pneumococcal infections, which were common in the lacrymal sac; this remedy must, however, be used freshly prepared and with discrimination. He referred to the frequency with which streptothrix infections of the canaliculi existed and were missed. Patients who had these infections usually were found to have to do with horses, and the infection was probably derived from dried horse manure.

Mr. D. LEIGHTON DAVIES (Cardiff) said he did not regard a patient who had had West's operation done on him as cured unless he was well three months afterwards. Though it could be guaranteed that every patient would go out of hospital cured a month or so later contraction of the scar might set in; 24 of 38 of his cases since 1912 had been permanently cured. There was a group of cases in which no complaint of epiphora was made afterwards, but in which fluid could not be got through into the nose. These he did not regard as complete cures, and he had not included them as such. Toti's operation was, he considered, best suited for young people; he had ceased to do it on patients aged 58 years and over, as they were liable to hæmorrhages.

Mr. A. GREENE (Norwich) referred to the occurrence of epiphora without ascertainable cause, and asked whether excision of the lacrymal gland was frequently suitable for these. He did not think the nose operation was satisfactory for a diseased lacrymal sac.

On Friday the Doyne Memorial Lecture was delivered by Miss IDA MANN (London), under the title

Some Observations on the Vascularisation of the Vertebrate Eye.

The arrangement of the intra-ocular blood-vessels showed many remarkable variations, she said, in different species of vertebrates. If the subject was studied from the point of view of comparative embryology, it became possible, by investigating stages of development common to several dissimilar species, to arrive at a classification of adult types based on their mode of production. This classification did not entirely correspond with the usual classification of the vertebrates. Although in most animals one type of ocular vascularisation corresponded with one class of vertebrates, yet there were many instances of overlapping (as when the lower reptiles showed amphibian characteristics) and of convergence, in which a similar structure was found in two entirely unrelated species, for example, in snakes and in rodents. So far as was known, these exceptions could not be correlated with similarity in other respects, except, possibly, with similarity of visual acuity. For the purposes of discussion, Miss Mann divided the ocular vessels into three sets: those of the choroid, of the retina, and of the iris. In this lecture the choroidal vessels were not considered in detail. She showed that the variations in the retinal and iridic vessels depended, developmentally, upon modifications of the proximal and of the distal end respectively of the hyaloid artery, which was present in all vertebrates at some embryonic stage. Its proximal end might undergo four possible modifications, and these produced the four main types of retinal vascularisation. (1) Complete atrophy of the vessel produced an avascular retina nourished entirely by the choroid. (2) Vascularisation of the epithelial cells on the optic disc produced a pecten, a structure typical of the birds. (3) Branching of the hyaloid proximally in the vitreous produced a membrana vasculosa retinæ. (4) Branching of the hyaloid proximally in the retina produced the arteria centralis retinæ of the primates.

It could be shown that the presence of a pupillary membrane during development had a marked influence on the definitive iris pattern. Those mammals which possessed it showed, in adult life, two types of circulation in the iris: a direct arterio-venous anastomosis in the superficial layers, and a capillary circulation in the deeper parts. Animals not possessing a pupillary membrane showed only the capillary system, and in them, too, there was a much greater range of iris pattern.

Slit-lamp appearances of the iris in a variety of lower animals were shown. A very wide range of modification was possible, not only in pigmentation but also in the number and arrangement of the main arteries and veins, and in the width and richness of the capillary plexus.

Dr. T. A. POOLE (Washington) read a paper on the Effects of Disease of the Paranasal Sinuses upon the Fixation Point; Mr. N. C. RIDLEY (Leicester) one on an Unusual Complication of Hodgkin's Disease; and Mr. E. N. HUGHES (Liverpool) one on the Structure of the Vitreous. Colonel H. HERBERT (Brighton) contributed a paper on the Cement Substance of the Intra-ocular Muscles and Glaucoma.

A discussion on

Ocular Manifestations Found in Head Injuries

was opened by Mr. HUGH CAIRNS (London). In the past, he said, undue attention had been paid to the fracture of the skull which often followed a blow on the head. It was true that certain of the ocular manifestations of head injury, such as damage to the optic and abducens nerves, were produced by the fracture, but, as a general rule, the important element of a head injury was not the fracture of the skull, but the injury to the underlying brain.

The greatest surgical problem was to know which cases would benefit by operation. Some patients would inevitably die soon after the injury—such cases being seen in greater numbers as the speed at which people travelled increased. In other cases it was soon evident, after the concussion had passed off, that the injury was comparatively mild, and that with suitable conservative treatment the patient would recover. There remained a third group, in which the outcome was for a time uncertain. These comprised cases in which, after recovery from the initial unconsciousness and concussion, there was either a relapse into coma or alternating periods of stupor and lucidity; and cases in which concussion did not occur, and unconsciousness only came on at an interval of hours or days after the accident. In this group the symptoms were usually due to a rise of intracranial pressure as a result of intracranial hæmorrhage, or œdema of the injured brain, or disturbance of the circulation of the cerebro-spinal fluid. It was often very difficult to decide which were the cases that would benefit by operation. In arriving at a decision about this the patient's state of unconsciousness was the most useful guide. A blow on the head tended to damage the brain not only at the site of the impact, but also at other places, especially at the opposite side of the brain.

Slight blurring of the discs, continued Mr. Cairns, could be seen in many cases which at operation showed a large blood-clot, severe cerebral œdema, or a collection of cerebro-spinal fluid in the subdural space. In 80 cases of head injury which he had seen in civil life there were only seven of definite papill-

œdema. Another cause for the appearance of papill-œdema after head injury was the collection of cerebro-spinal fluid, often mixed with blood, in the subdural space. When papillœdema was present the patient should have operative treatment, even though at the time he might be relatively free from symptoms. A well-planned decompression would give the patient a much better chance of avoiding the chronic ill-health which otherwise so often followed head injury. Lateral deviation of the head and eyes towards the injured side was very important as indicating the side of the main lesion. Great reliance could also be placed on dilatation and fixity of one pupil as indicating that the major cerebral lesion was on the same side of the body. This sign was particularly valuable when other neurological evidence seemed to indicate that the lesion was on the opposite side. The whole subject of pupillary reactions in head injuries was very complicated, and was worthy of close investigation. Mydriatics and morphia should never be used in cases of head injury.

Mr. Cairns went on to deal with injuries to the geniculo-calcarine pathway, remarking that the occipital lobe was frequently damaged in head injuries. Except in perforating injuries, however, the damage was superficial and tended to be limited to the occipital pole and the outer aspect of the occipital pole, thus sparing the greater part of the visual area. This might, he suggested, explain the fact that homonymous defects of the visual fields were only rarely observed in head injuries in civil practice. Inability to read words and letters and to recognise objects, though visual acuity was good, was observed not infrequently in association with intracranial tumours, and in vascular disease and penetrating injuries of the brain. Injuries of the fibre-tracts and nuclei which controlled movements of the eyes seemed to be rare, at least in cases of head injury which recovered from the immediate effects of the injury.

Finally, the speaker dealt with disturbances of vision in persistent cerebral contusion. Some patients, after a blow on the head, perhaps only of slight degree, suffered from persistent headache and attacks of dizziness, these attacks being brought on or aggravated by exertion. As neurological examination was negative, there was a tendency to regard the condition as functional. He suggested, however, that the basis was an unresolved cerebral contusion. Most of these patients had subjective visual disturbance, with an ache behind the eyes, sometimes with photophobia.

Mr. CHARLES GOULDEN dealt with the subject from the ophthalmological aspect. He began by referring to Mr. Bathe Rawling's Hunterian Lectures of 1904 on Fracture of the Skull, which shed valuable light, he said, on several problems, and laid down principles of diagnosis whereby the probable course of fracture could be predicted if the site of the blow was known. 60 to 70 per cent. of cases of fracture of the base were shown to be due to direct violence applied to the neighbourhood of the base of the skull, whereas 30 to 40 per cent. of basal fractures were due to radiation from fractures of the vault. The path which a fracture of the base might take was largely determined by the various fissures and foramina of the base. Rawling had shown that a fracture involving the optic canal might occur in any fracture of the skull, and such a fracture was more probable when the injury to the head was in the neighbourhood of the orbit. In a certain number the result was partial or total primary optic atrophy, the lesion being in nearly all cases unilateral. After a blow on the head, usually near the orbit—perhaps not sufficiently severe to cause unconsciousness—the eye on the side of the injury was blind. The pupil was dilated and inactive, there was no perception of light, and the ophthalmoscope revealed no pathological signs. After an interval of two to six weeks the appearance of primary optic atrophy was found with normal blood-vessels. In fracture of the middle fossa there might be injury to the optic chiasma, due to laceration by a fragment of bone, crushing or compression, and the optic tracts were exposed to some similar injury. Such injuries would lead to defects in the visual fields; and cases had been reported of bitemporal hemianopia, presumably due to laceration of the chiasma in its inner part. There might be total blindness in one eye and temporal hemianopia in the other.

Mr. Goulden drew attention to the value of the pupillary reactions in cases of injury to the optic nerve in fracture of the skull. Reflex iridoplegia had been observed after injury to the skull. The other nerves liable to injury in fracture of the base were the oculomotor, the trochlear, the trigeminal, the abducens, and the facial. The nerve most commonly involved was the abducens, with consequent paralysis of the external rectus. The oculomotor nerve was only rarely affected. In fractures involving the sphenoidal fissure there might be a complete internal and external ophthalmoplegia, but in that event there was usually an involvement of the other nerves which passed along the cavernous sinus and through the sphenoidal fissure. The fifth nerve was rarely affected in fractures of the base of the skull. The facial was that most involved in these accidents; Boehm found it involved in 22 per cent. of cases of fractured base. The internal carotid artery was most liable to injury at the point where it crossed the line of fracture from one middle fossa to the other.

A number of other papers were read during the Congress, and an exhibition of ophthalmic instruments and other exhibits was held.

MATERNITY AND CHILD WELFARE.

FIFTH ENGLISH-SPEAKING CONFERENCE.

LONDON, JULY 2ND–4TH, 1929.

A CONFERENCE organised on behalf of the National Council for Maternity and Child Welfare by the National Association for the Prevention of Infant Mortality in coöperation with the M. & C.W. Group of the Society of Medical Officers of Health was held last week at Friends House, Euston-road, London, N.W. Brief notice has already been given to the opening session which dealt with the welfare of the child between 1 and 5 years.

PRESIDENTIAL ADDRESS.

In his encouraging and inspiring presidential address, unavoidably postponed until the third day of the conference, the Minister of Health, Mr. ARTHUR GREENWOOD, welcomed the overseas visitors and expressed his good wishes for the success of Dame Janet Campbell's forthcoming visit to Australia. He went on to refer to the progress made in the reduction of infant mortality and to the great possibilities of further progress. There were still black spots and we did not get a hundred per cent. value from existing regulations. We must look backward to the mother and forward to the school-child. Maternal mortality was a most obstinate problem and for its defeat a new holy war in a real crusading spirit was needed. Education would gradually overcome reluctance to attend antenatal centres. They must have widespread vision and a long distance and comprehensive programme. It was futile to leave the child alone when a half-finished product and, without being grandmotherly or grandfatherly, they needed to exercise constant watching care from birth to death to ensure the best citizenship. Most children were born normal, and the problem was how to keep them so. He hoped to be able to do something to improve the status of the midwife and to leave his mark on the public health service. He had the highest regard for voluntary workers. There was not enough of such work. Enthusiasm was reborn at every such conference as theirs.

MATERNAL MORBIDITY.

A whole day was devoted to the consideration of various aspects of this subject, the morning session being presided over by Prof. A. Louise McIlroy, D.B.E., and the afternoon by Surgeon J. S. Boggess, representing the U.S.A. Government.

Maternity Nursing.

This discussion brought out unanimity among the speakers and the auditors that every woman should be attended at her confinement by a well-trained midwife and that such midwives should have an improved status and a higher remuneration, so that better educated women may be attracted to the profession and that those who adopt it may be in a position to devote a greater knowledge and more time to each case. It follows that in many or most cases the midwives will have to be subsidised, or the maternity benefit will need to be increased and more carefully allocated; and that the handy woman will have to disappear as a midwifery attendant but may join the ranks of the home helpers.

Several speakers referred to the higher status of midwives in Sweden, where they have been recognised since 1700. In Sweden the maternal mortality is only half what it is in this country, and the Swedish midwives undergo a much more complete training, including a course in pædiatrics.

Dame JANET CAMPBELL pointed out that only an adequately trained woman was able to note in the interests of both mother and child the slightest departure from the normal, and that the visiting midwife can do much to avert disaster if she is able to devote more knowledge and time to her cases. The best way, she said, of getting rid of the handy woman is to make the services of a midwife easily obtainable by all patients needing maternity nursing. The problem was mainly an economic one. By encouraging the midwife we could get better nursing and relegate the untrained woman to her proper function as a home help.

Dr. J. S. FAIRBAIRN agreed that nursing attendance on confinements should be restricted to certificated midwives and emphasised the points that the experienced midwife of the right type was successful in obtaining a maximum of normal deliveries and normal lactations and in securing surgical cleanliness during the puerperium, and was in a position to make reliable reports to the doctor as to the progress of both mother and baby. Till every mother, Dr. Fairbairn concluded, had a certified midwife to nurse her and the handy woman and all inferiorly trained nurses were wiped out, puerperal morbidity would continue more rife than it should be.

Miss E. DOUBLEDAY (College of Nursing), in approaching the subject from the nursing point of view, was in entire agreement with the two previous speakers, and gave in some detail a description of the many functions and duties of a midwife which called for expert knowledge. The medical profession, she said, must insist that maternity nursing be only done by certified midwives. She concluded with a plea for the education of the public as to the need for improved maternity nursing both for those who can and for those who cannot pay.

Other points made in the discussion were—that at 30*s.* a case a midwife cannot earn an adequate income, that hospital extern departments are reluctant to undertake the nursing of abortions, and that there is a real danger to the patient if the midwifery attendants suffer from catarrhal symptoms, especially in times of epidemics.

In replying on the discussion, Miss DOUBLEDAY said that the local authority had power to pay for the services of a maternity nurse and she expressed her opinion that extern cases should be nursed by the hospital staff and that the payment of a separate fee for antenatal work would be a retrograde step.—Dame JANET agreed that the nursing of miscarriages was neglected. She also stressed the point that the working-class woman cannot pay an adequate fee, and that greater facility for the provision of trained maternity nurses is a more effective method of getting rid of the handy woman than penalisation.

Home Helps.

In addition to doctor and midwife someone is needed to look after the domestic comfort of the household if the mother is to enjoy the physical rest and peace of mind which she requires. Miss F. E. WRIGHT, assistant superintendent of health visitors, described the Birmingham scheme for supplying home helps at charges diminishing in proportion to the family income; and at the same time deplored the small use made of this service up to the present. Forty home helps were employed in the city and attended 404 cases during 1928, whilst the number of births was 17,222. The payment made to the home helps was 5*s.* a day (from 8 A.M. to about 6 P.M.) and she is expected to provide her own food.

Dr. S. G. MOORE said that Huddersfield provided free home helps and Dr. FRANK ROBINSON could not understand why they received so few applications for home helps under their Cambridgeshire scheme.

Mrs. BLAKE (Crewkerne) said her authority only contributed towards a home help if a maternity nurse had been engaged.

The Question of Abortion.

In this discussion there was general recognition of the fact that criminal abortion is very largely on the increase in most countries, and that it is a very common cause of fatal puerperal sepsis. There are no statistics available in this country but appalling statistics are available from Germany. As it is agreed that spontaneous abortion does not usually lead to sepsis or a fatal result, and as therapeutic induced labour in skilled hands only exceptionally gives rise to fatalities, it may be inferred that, practically speaking, every case of sepsis or death following abortion is due to criminal abortion.

Dr. COMYNS BERKELEY, in opening the discussion, said there had been no improvement in the death-rate from childbirth or puerperal sepsis in the last 20 years. He described the essentials for an improved medical service: better educated doctors and midwives; more hospital beds; antenatal centres linked up with a consulting antenatal centre preferably at a hospital, &c.; and he laid especial stress on the need for educating the public as to the required remedies. Midwifery was the worst paid profession in the world. He pointed out that legitimate induction of labour was not dangerous. Criminal abortion was greatly on the increase and a common cause of sepsis.

Miss SUSAN MUSSON (general secretary, National Council for the Unmarried Mother and Her Child) spoke as to the widespread prevalence of the sale of drugs as abortifacients. Her Council could speak from the knowledge of nearly 8000 cases in the past ten years. The death-rate from childbirth among unmarried mothers was twice as high as among married. In their case department they listened to astounding stories of the pills, powders, and potions which had been advised and administered. Their most dangerous enemy was the retail shop which sold "pills for ladies," "female pills," or "pills to remove irregularities." Trade by correspondence was very common, though the Advertising Association had recently persuaded the press to refuse such advertisements. Unfortunately, the firms which supplied abortifacients, or supposed abortifacients, also dealt largely in birth control accessories, and abortifacient drugs were supplied through advertisements which purported to deal only with birth control. There was a loophole in the law as to the sale of lead preparations, in that lead plaster made by machinery was excluded and she had been informed by a leading gynæcologist that a woman could buy for a penny enough diachylon plaster to poison herself, cause abortion, and leave her a mental and physical

wreck. The Home Office should be pressed to dea with this matter. Miss Musson's conclusion was that public opinion must be educated to deal less hardly with the unmarried mother in order that she may shun these so-called remedies, which endanger the life of herself and her child.

Mr. F. E. SCRASE, F.R.C.S. (M.O.H., Hampstead), described the scheme for a panel of consultant gynæcologists and obstetricians which was working satisfactorily in his borough.

Dr. DOROTHY R. MENDENHALL (U.S. Children's Bureau) read a paper on maternal mortality in the U.S.A., and gave statistics as to the variations of the maternal death-rate between one State and another and among the white and coloured populations. The latter were largely attended by untrained midwives. A study by the Bureau extending over a two-year period, not quite completed, indicated that deaths following abortion contributed largely to maternal mortality and particularly that from sepsis. In the discussion it was pointed out that the recent increase of criminal abortion was very largely among married women (one speaker referred to a wife who had performed abortion on herself seven times), and the advocates of birth control claimed this as a cogent reason for giving sound advice as to contraceptive methods.

Other points made were: that women taking drugs will not attend antenatal centres; that there is no hospital treatment for abortions, and consequently no adequate education of medical students in the treatment of abortion.

Special V.D. Clinics.

A whole session was allotted to a discussion on the holding of special venereal disease clinics for women and children in connexion with maternity and child welfare departments. The main points emerging were: the need for a better linking up of all the medical services for the discovery of venereal disease with a view to securing special treatment in well-equipped premises with no label attached to them, and particularly the devising of methods which make it easy for the pregnant woman to secure early treatment; and also the need for combating the greatly exaggerated view held by both the medical profession and the public as to the risk of contagion.

In his introductory remarks Mr. E. B. TURNER, F.R.C.S. (Chairman of the Executive Committee, British Social Hygiene Council), voiced the anxiety of his Council to see all maternity and child welfare centres equipped with facilities and means for diagnosis, and the establishment of special clinics at unlabelled premises for the treatment of married women.

Dr. DAVID LEES (V.D. Medical Officer, Edinburgh) said that 60 per cent. of these diseases were not acquired through illicit sexual intercourse. The amount of gonorrhœa under treatment had increased but we were not yet treating anything like all of it. Gynæcological hospitals, children's hospitals, maternity hospitals, and maternity and child welfare centres were not used as they might be in their schemes. The last named should at least have the means of diagnosis. The labelling of discharges in pregnancy as venereal should be avoided. A centralised control of their schemes was very important. Health visitors were not at present educated for following up V.D. cases. With ordinary care there was no danger from contagion or cross-infection in hospitals. In new general hospitals there should be first-class equipment and service for dealing with venereal diseases. There should be no labelling and the same waiting-room should be used for different purposes at different hours.

Dr. VIOLET RUSSELL (V.D. Medical Officer, Guy's Hospital) favoured treatment for pregnant women at maternity centres. There should be proper facilities for diagnosis and a consultant available at all centres. Special difficulties arose from the attempt to transfer pregnant women from the centres to the V.D. centres for treatment, and, in order to secure the desired result, everything must be made easy and pleasant for the pregnant woman. Children with congenital disease and their mothers, when not pregnant, could be treated at the V.D. clinics. She had met with cases of gonorrhœal vulvitis in girls spread by unhygienic w.c. seats, and advocated the use of seats such as those used on the Continent. As the result of five years' experience at the antenatal clinic, they had found 5 per cent. with a positive Wassermann reaction. Diagnosis was often difficult clinically and the patient was frequently unaware of her complaint. The medical officer of the antenatal clinic should not wholly let his patient go but should call in the V.D. officer to carry out the special treatment. Lock hospitals should be abolished. Their great aim should be to secure the antenatal examination of every pregnant woman and the early treatment of every syphilitic so found.

Dr. NORAH I. WATTIE (Assistant V.D. Medical Officer, Glasgow) thought that antenatal supervision in Scotland was now extended to about 50 per cent. of pregnant women. She alluded to the difficulties in the diagnosis of gonorrhœa and advocated several examinations. Treatment was provided in Glasgow at the centres but cases requiring daily treatment received such at the V.D. clinic, while still attending once a week at the centre. This compromise worked satisfactorily.

Dr. NAYLOR BARLOW (M.O.H., Wallasey) complained that the Ministry had recently refused to give consent to the establishment of a first-class composite clinic, including V.D. in Wallasey.

Dr. D. BREWER (M.O.H., Swindon) said that suspects should not be sent to the V.D. clinics. He would like to see the special treatment carried out by special officers at a general clinic as proposed at Wallasey.

Miss MUSSON advocated the treatment of expectant mothers at maternity hospitals.

Dr. P. S. BLAKER (Dudley) stated that they had appointed a new V.D. officer to do antenatal and other work with facilities for immediate diagnosis at the centres, thus linking up the V.D. with the M. & C.W. work.

In reply, Dr. LEES expressed his opinion that gonorrhœa was not a cause of puerperal septicæmia but rather of a sapræmia arising about the tenth to the fourteenth day. Antenatal work diminished the risk of septicæmia. Any child born with a syphilitic rash in a maternity hospital was a reflection on our schemes and meant failure to secure antenatal supervision and early treatment. He spoke approvingly of the great increase of suspects at their clinics in Edinburgh. Linking up well-equipped premises for the work, and a juster appreciation of the real risk of contagion were both very necessary. As these diseases were so frequently not acquired "venereally," he preferred to call a spade a spade and to talk about gonorrhœa and syphilis rather than venereal disease.

WORK OF GUY'S HOSPITAL.—The annual report of this great institution shows that in 1928 11,000 in-patients and 126,000 out-patients were treated at a cost of £180,000; out-patients made 547,000 attendances. The income from endowments was £66,567, but the annual subscriptions amounted only to £6,000. The downward movement of the rate of mortality which for three years had remained stationary at 5·5 per cent., has been resumed, and last year was 5·2 per cent. There has been a remarkable growth of confidence in the venereal diseases clinic. In 1924 its first year as a whole time clinic, the attendances numbered 21,706; in 1928 they were 61,148. The percentage of cases discharged as cured shows a marked upward curve. A new departure is the allotting of four beds to cases requiring extensive or special types of dental treatment. In the State examinations Guy's nurses were notably successful, only four out of 78 failing in the preliminary, and two out of 54 in the final. At the close of the year the total number of available beds was 646.

Reviews and Notices of Books.

A TEXT-BOOK OF PULMONARY TUBERCULOSIS FOR STUDENTS.

By R. C. WINGFIELD, M.B. Oxf., F.R.C.P. Lond., Medical Superintendent, Brompton Hospital Sanatorium, Frimley. London: Constable and Co., Ltd. 1929. Pp. 401. 31*s.* 6*d.*

THIS book is clearly written and full of information which will be appreciated not only by the student but also by tuberculosis officers and others interested in consumption. The first few chapters deal with epidemiology and the effect of the tubercle bacillus on the tissues, and here we are in the realm of debate, but the author's arguments are well expressed, and his summing up of the experimental work and views of different authors is lucid and convincing. He emphasises the fact that tuberculosis in the adult is practically confined to a chronic disease of the lungs and cannot be compared to tuberculosis in the infant, where the manifestations of the infection are so different that they produce quite another type of disease. The decline in mortality is ascribed to urbanisation, which, though leading to a preliminary rise in the death-rate, is followed by a fall as the succeeding selected generation, immunised by the infantile infection, reaches adult age. The adult is relatively immune, but if an old lesion (not of necessity in the lung) becomes active or reinfection takes place at a time when immunity happens to be at a low ebb the bacilli may multiply and be carried to the lungs in sufficient numbers to cause phthisis.

There is a very full account of methods of physical examination, but the reader is warned that physical signs no longer hold the "pride of place in the equipment of the chest specialist" as in days gone by. The thorax is by no means built to pattern, and, therefore, even in health, sounds heard on auscultation or percussion will vary, and what is normal in one may be abnormal in another. The importance of a careful and thorough physical examination is admitted, but in most cases symptoms and other means of examination point to a true diagnosis before the appearance of physical signs, and the old habit of giving a clean bill of health because no signs are detected is fortunately passing away. The author rightly emphasises the fact that it is not enough to say "this patient is infected with tubercle bacilli," but one must also go on to say whether the symptoms are or are not due to that infection. In Chapter IX., which deals with classification and assessment, it is clearly explained that although pulmonary tuberculosis is one disease, yet it is a disease of many phases, each requiring different treatment.

The last eight chapters are devoted to treatment, and it is most refreshing to find so much space given to such an important subject. The reader is warned to shun the extremist, and the author himself keeps an open mind. For example, he does not regard tuberculin as a really valuable method of treatment, yet he devotes a whole chapter to a fair discussion of its possibilities and limitations. The description of sanatorium treatment is of special interest for the purpose of the treatment is made clear, and one can therefore understand why certain patients are unsuitable and others obtain great benefit. The chief criticism of the sanatorium system is that it fails with advanced cases, but, after all, its main object is to prevent mild cases from becoming advanced. Many a life is thrown away by waiting for the patient to pass from the early and curable into the later and incurable stage before advising sanatorium treatment. We agree with the author that the physician who bewails the results of sanatorium treatment among his patients is oftentimes but bewailing his own inefficiency. The technique of the simpler laboratory methods are described in a brief appendix, and the book concludes with a useful index.

A text-book on tuberculosis was wanted. This one can be thoroughly recommended to all interested in tuberculosis, not only as a text-book but also as a work of reference.

HANDBOOK OF CLINICAL CHEMICAL PATHOLOGY.

By FRANK SCOTT FOWWEATHER, M.D., M.Sc., D.P.H., F.I.C., Lecturer in Chemical Pathology, University of Leeds. With a foreword by Sir BERKELEY MOYNIHAN. London: J. and A. Churchill. 1929. Pp. 216. 8*s.* 6*d.*

IT is obvious that the study, by means of chemical analyses, of the fluctuations and alterations of the body's functions has thrown considerable light on the mechanism of disease, and in this field the subject of chemical pathology has surely still more to give to us. Its chief interest to the medical profession appears to be on a somewhat lower plane, for the demand for new and practical methods of diagnosis by means of what are usually described as "laboratory tests" is insatiable. In an age when most of us are afraid of not being up to date these tests are much in vogue; and the author of this book, realising the inherent dangers of such a situation, has set out to describe how, when, and why they should be carried out. It is not a laboratory manual, and all details of the actual methods of analyses have therefore been avoided. The investigation of renal function, liver function, gastric function, and so on are dealt with on conventional lines in a simple manner which should be useful to the student. Apart from the description and discussion of diagnostic tests there are other chapters devoted to some of the recent advances which have been made in medicine. In these are described the vitamins and deficiency diseases, basal metabolism, anoxæmia, acid-base balance, and the toxæmias of pregnancy.

There is no information in the book which is not already available elsewhere, for the most part in the series on Recent Advances issued by the same publishers. But Dr. Fowweather presents it clearly and concisely and has produced a useful guide to the subject. The chief disappointment of the book is that the reader is left in considerable doubt as to the value of some of the tests. We exclude from this criticism the chapters on the investigation of pancreatic and intestinal conditions where definite pronouncements are made on the uselessness of many tests and on the value of others. The experience of the Leeds school, which has such a high reputation for surgery, on the value of chemical tests for the diagnosis of cancer and ulcer of the stomach, would have been interesting. Tests for occult blood in the fæces are highly esteemed in some places and neglected elsewhere. For these very reasons, perhaps, the author has been content to describe some of the tests and to leave their assessment an open question.

THE TROUBLED CONSCIENCE AND THE INSANE MIND.

By CHARLES BLONDEL, Professor of Psychology in the University of Strasbourg. With an introduction by F. G. CROOKSHANK, M.D., F.R.C.P. London: Kegan Paul, Trench, Trübner and Co., Ltd. Pp. 91. 2*s.* 6*d.*

THIS little volume is one of the Psyche Miniature Series, and will prove of very genuine interest to psychiatrists, and to the general reader with a taste for philosophical study. It is not quite clear who is responsible for the admirable translation from French into English, but Dr. Crookshank provides an introduction in which he gives a résumé of the psychological conceptions behind Prof. Blondel's essay. The translation is so good that the reader would forget that the essay was originally written in French but for the constant use of the term "delirium," not only in the usual English sense of the word, but also as a synonym for "psychosis."

The book is an attempt to explain the irrational and dissociated behaviour and language of the insane.

The author points out that the speech of insane persons ceases to be language, since it fails to make their meaning clear, either to others or to themselves. This fact the writer attributes to a fundamental difference between the experience of the insane as compared with the sane. Dr. Blondel insists that full consciousness in the normal must consist of two parts, and that for normal consciousness a certain separation takes place, similar to the pouring off of one liquid from another. Healthy minds select only those experiences which are identified with collective experience and find ready linguistic expression. Those sensations and feelings attributed to the viscera and the activities of the vegetative nervous system (cenesthesia) remain on the fringe of consciousness, and have no place in language. Dr. Blondel supposes that the insane mind, with its feelings of depersonalisation and obvious disorder of expression, is due to the invasion of normal consciousness by cenesthesia, with consequent failure on the part of the patient to find adequate verbal expression for his experience.

These brief sentences give but a meagre idea of the purpose of the essay in which the reader will find material help in clarifying his ideas of the relationships between body and mind. There is but little reference to Freudian conceptions; in a sense the book may be regarded as an attempt to place the conception of the unconscious on an organic basis. The influence of cenesthesia in the normal mind is perhaps underrated by Dr. Blondel. It is obvious that the work owes much to the writings of Derkheim and Bergson.

THE EXCITABILITY OF MUSCLE.

Handbuch der Biologischen Arbeitsmethoden—Methoden zum Studien der Functionen der Einzelnen Organe des Tierischen Organismus. Abt. V. Teil 5A, Heft 5. Berlin: Urban and Schwarzenberg. 1929.

THIS section of Abderhalden's "Handbuch" contains a detailed account of Lapicque's methods of measuring excitability, translated from the French of Henri Laugier. Theoretical considerations are discussed only in so far as they are needed to make the applications of the methods intelligible. The section includes also an essay on the measurement of tone, and one on the methods used in the investigations on plain muscle. Both these give adequate descriptions of current practice, but the bibliographies reveal a degree of "insularity" which is commoner perhaps in continental than in English writers. While this engenders a doubt as to the comprehensiveness of the authors' erudition, it hardly reduces the interest for readers in this country.

CANCER.

A Practical Résumé of the Subject for General Practitioners. By G. JEANNENEY, Professor in the Faculty of Medicine, Surgeon to the Hospitals of Bordeaux. Translated by JOHN GIBSON, *M.C.*, M.A., M.D., and JOHN H. WATSON, M.B., B.S., F.R.C.S. London: H. K. Lewis and Co., Ltd. 1929. With 33 illustrations. Pp. 186. 7*s.* 6*d.*

THE object of this little book, as stated in the foreword, is to recall to the practitioner as shortly as possible the elements of the diagnosis of cancer at its onset in order to ensure early treatment. Consideration is therefore given only to the clinical aspects of the disease. The author says that he has endeavoured "to emphasise facts which will be true in ten years' time—except in the case of treatment—for clinical manifestations do not change." He proceeds, however, to make a statement which is not true to-day and will not be true ten years hence—namely, that there are cancer houses and cancer villages. The discussion of the pathology of the condition is inadequate. The book consists mainly of a brief account of the clinical symptoms of the disease in the different organs for the purpose of providing help in diagnosis. This is followed by a short account of treatment—surgical and radiological. In so far as the carrying out of these forms of treatment is not within the province of the practitioner, this section might well have been curtailed to provide more space for one of the most difficult tasks which a practitioner has to face—the medical treatment of cancer in its final stages. This subject is dismissed in two pages. The book does not contain any information which might not be found in any good text-book on surgery. The translation is well done.

KRAEMER'S SCIENTIFIC AND APPLIED PHARMACOGNOSY.

Third edition. By an Editorial Committee consisting of Editor-in-Chief, EDWIN L. NEWCOMB, P.D., Ph.M., Phar.D., Secretary National Wholesale Druggists' Association; and Co-Editors, LEASURE K. DARBAKER, Phar.D., Professor of Histological Pharmacognosy, University of Pittsburgh; EARL B. FISCHER, B.S., Professor of Pharmaceutical Botany and Pharmacognosy, University of Minnesota; EDMUND N. GATHERCOAL, Ph.G., Professor of Pharmacognosy, University of Illinois. London: Chapman and Hall, Ltd. Pp. 893. 37*s.* 6*d.*

IF to the medical man of to-day pharmacognosy or the recognition of drugs and the study of crude materials is a subject of little interest, it is because the competition associated with the commercial development of pharmacy has led to an almost embarrassing supply of purified and standardised products from which he can choose the one most suitable for his purpose. The intensive study of crude drugs now lies more in the domain of applied botany and chemistry than of medicine, but the doctor should be able to recognise some of the more commonly employed preparations and to know something of their properties. He will find these, as well as rare preparations, well described in this book, written by the late Henry Kraemer in 1916, which reached a second edition in 1920, and has now, after the death of the author, been revised for a third edition by an editorial committee, four of the best known pharmacognoscists in the United States. The general plan of the text has been retained, the statements relating to morphology have been checked, and information concerning the constituents of drugs has been critically reviewed and revised in the light of recent research. The chapters on commercial starches and on bacterial remedies have been entirely rewritten, and numerous minor alterations have been made with a view to increasing the accuracy and value of the work. A new key for the analysis of powdered drugs by means of the microscope has been introduced. The book, we anticipate, will continue to be of great assistance as a text-book for students of pharmacy, and as a work of reference for botanists, chemists, food and drug analysts, and pharmacologists. The lay reader should not accept as strictly accurate some of the brief statements regarding the general action and therapeutic uses of drugs, which the editorial board has introduced into this edition.

POPULAR BOOKS ON FOOD AND HEALTH.

Food. By ROBERT MCCARRISON, C.I.E., M.D., D.Sc., LL.D., F.R.C.P., Director of Nutritional Research, Pasteur Institute, Coonor, S. India. Madras: Macmillan and Co., Ltd. 1928. Pp. 115. 1*s.*

Good Health. By IAN S. THOMSON, M.A., M.D., D.P.H. With a foreword by Sir ARTHUR KEITH, M.D., LL.D., F.R.S. London: Longmans, Green and Co. 1929. Pp. 122. 3*s.* 6*d.*

THE number of popular books on health is very large, but the quality of most of them is poor. These two volumes, however, show how much sound information can be given in simple language by an expert at exposition. Col. McCarrison's book is intended as

a primer for use in schools, colleges, welfare centres, boy scout and girl guide organisations in India, where nutrition is one of the most pressing problems of the day. If the young people can be taught what to eat and why to eat it, a great step will have been taken towards improving the health of the nation. The author makes his instruction interesting by supplying concrete details. He builds his description of the component parts of food round a "food star" and takes the child by easy stages from air, sunlight, and water right through to vitamin D. He discusses the foodstuffs in common use and points out the faults of Indian diets and of Anglo-Indian and European diets in India and shows how these could all be rectified. The effect of diet on the teeth and the physiology of the gastro-intestinal tract are described, also the amount and balance of foodstuffs required in a perfect diet. There are just over a hundred pages in this little book, but the instruction is given in concentrated form without padding, and it can be recommended as a model of its kind.

Dr. Thomson's book is extremely well written. The author is the son of Prof. J. Arthur Thomson whose popular writings have a wide and appreciative public and has evidently inherited the rare gift of presenting a difficult subject in a clear way without becoming sensational or sentimental. Moreover, he is free from fads and as far as possible presents facts in such a way that the reader may make his own judgments. There are 20 chapters in his book and none of them is dull. He begins with the infant, with a throw-back to bring in antenatal influences, and then deals with such subjects as digestion, ductless glands, mental diseases in separate sections, arranged on no very definite plan. Dr. Thomson has included some useful chapters on subjects not generally discussed in books of this type, such as State medicine and patent medicines. The book is essentially a pleasant collection of essays which medical men as well as laymen will read with pleasure.

THE ORGANISATION OF AN OPERATING THEATRE.

Organisation und Ordnungsgemässer Betrieb des Operationssaals. Von Prof. Dr. MAX KAPPIS, Hanover. Leipzig: Georg Thieme. Pp. 119. M.4.8.

THIS little volume gives an accurate and detailed description of all the technical requirements of the operating theatre, and should be invaluable to those who have to organise this highly specialised branch of technical surgery. Not only is the equipment of a theatre fully described, but most precise details are given as to the best methods for the sterilising of all materials, the preparation of catgut, and of every solution that the surgeon can possibly require. No such elaborate handbook has been published in English, and we hope that Prof. Kappis will earn the gratitude of English surgeons by arranging for its translation.

TROPICAL NURSING.

A Handbook for Nurses and Others going Abroad. By A. L. GREGG, M.D., M.Ch., D.T.M. & H. Lond. With a foreword by the Hon. Sir ARTHUR STANLEY. London: Cassell and Co., Ltd. 1929. Pp. 199. 6*s*.

THIS little book does pioneer work in giving to the nurse trained at home and going abroad for the first time a guide which should enable her to keep her health and to cope with strange and new emergencies till medical help arrives. It deals first with personal hygiene, and next, in a section which fills most of its pages, with a series of diseases which are important in different parts of the tropics. For example, in beri-beri great emphasis is laid on the need of extreme care to avoid all risk of blame for a sudden heart failure; any relaxation of the vigilance advised in the book should be allowed only by doctor's orders. Blackwater, cholera, the dysenteries, malaria, sprue, yellow fever, and worm infections, to name a few only, are well considered. But the anthelmintic dosage for intestinal infections is perhaps higher than seems wise in a book destined for nurses, the author holding 1 drachm as the equivalent of 3 c.cm. of carbon tetrachloride, though a table of weights and measures at the end of the book supplies the proper ratio. This valuable section is followed by another on the techniques used for blood examination and transfusion, for bowel lavage and the test-meal, and for intramuscular and intravenous injections. There is also a note on the care of the eyes and a glossary of medical terms which will be particularly valuable for those laymen who, the author reasonably hopes, will find useful material in its pages. The nurse trained in the tropics, as so many now are, will also glean from it much to help and interest her.

DENTAL ANATOMY.

Classroom and Laboratory Quiz Compend. By W. C. STILLSON, D.D.S., Associate Professor of Dental Anatomy, Western Reserve University, Dental School. London and Philadelphia: W. B. Saunders Company, Ltd. 1929. Pp. 280. 10*s*.

IN America the coaching class is picturesquely called the quiz class. But while the method of question and answer is well adapted to put the student on his mettle and enable the teacher to assess his knowledge, we are doubtful whether the method when applied to revision or cram books is satisfactory even from the standpoint of helping the student to pass his examination. This book consists of a large number of brief questions with brief answers, many of them so trivial and obvious that even the student ridden with the obsession that every examiner is out to trap him, could not but know the correct reply. Dental anatomy if properly taught can be quite an interesting subject, but no one reading through this dreary compilation could possibly believe this.

JOURNALS.

THE INDIAN JOURNAL OF MEDICAL RESEARCH for April, 1929, Vol. XV., No. 4, contains some 29 contributions.—N. H. Fairley continues his studies on sprue with F. Jasudasan, and shows that the complement reaction in sprue with *Monilia psilosis* vaccine is of no value.—B. N. Chatterjee and E. W. H. Cruickshank have studied the comparative histology of the spleen in various vertebrates and the effect of iron on the hæmogenic organs.—L. E. Napier has two comparative papers on Urea Stibamine and Stibamine Glucoside.—R. N. Chopra and S. G. Choudhury write on the causation of the formol-gel reaction in kala-azar and physical properties of different blood sera.—C. G. Pandit, S. R. Pandit, and Seetharama Iyer on the Adhesion Phenomenon in Filariasis and on a new species of Filaria Worm in Birds.—T. C. Boyd and A. C. Roy describe some Biochemical Aspects of Chyluria.—A. D. Stewart and S. C. Ghosal have investigated the germicidal action of the activated sludge process.—S. Khan and M. N. Agarwal have studied the Duration of Life in the Vibrios in the Ganges and Jumna River Water.—S. D. S. Greval writes on the Kahn, Microkahn, and Wassermann Reactions in a study of 2066 cases.—V. T. Korke believes he has discovered *Filaria malayi* in India.—J. Cunningham describes a new Technique for Handling Infected Monkeys.—Clive Newcomb has a paper on the Composition of Vesical Calculi in India.—P. J. Barraud continues his revision of the Culicine Mosquitoes of India.—R. B. Lloyd, L. E. Napier, and S. N. Paul believe that the serological observations are useful in the control of the treatment of kala-azar.—H. W. Mulligan has studied the reticulo-endothelial system in malaria.—R. Row has made observations on malarial parasites grown aerobically in simple cultures with special reference to the evolution and degeneration of crescents.—T. N. S. Raghavachari and S. Y. Ganepati describe observations on the water of the Red Hills Lake at Madras.

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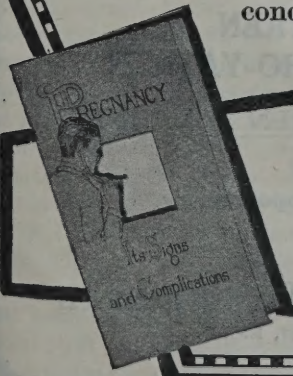

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THE LANCET.

LONDON: SATURDAY, JULY 13, 1929.

THE ORTHOPÆDIC CONGRESS.

A RECENT feature in our science has been the development of orthopædic surgery, arising out of the need for increased knowledge and perfection of technique felt when the war brought into all the hospitals of Europe an influx of mutilated men. Every nation then felt alike the responsibility incurred, and the Congress held last week in London when the Orthopædic Associations of America and this country sat in joint session, has demonstrated the many directions in which orthopædics have advanced and demonstrated also, alas! how much remains to be done if many crippling and painful conditions are to be removed or mitigated.

The programme of the Congress had this interesting side—it revealed a pre-occupation with common lesions which should encourage the family doctor. The subjects discussed were of wide practical interest to the profession as a whole, and nearly every speaker showed that without the coöperation of the general practitioner the efforts to improve the end-results of treatment would be fruitless. To secure bony union in intracapsular fractures of the neck of the femur; to diagnose at the earliest possible moment congenital dislocation of the hip, which becomes such a serious deformity when neglected; to shorten and simplify the course of chronic sepsis in bones; to deal with those very common and tedious cases of low back pain—all these are problems which confront the practitioner daily, and their solution depends largely on the rules which the specialist is able to formulate for his guidance. But the orthopædic surgeons are powerless to test new theories or to assess the value of practical measures based on mechanical principles without enlisting the practitioners' interest. Nothing is more likely to ensure such coöperation than the conviction that not only the fractured femur and the victim of anterior poliomyelitis, but the man with an intractable pain in the lower part of his back is the subject of scientific consideration. The communications submitted were of high merit. Among the most illuminating was the address on the basic principles involved in the treatment of the common spinal conditions as well as in the functions of the viscera, in which Dr. J. E. GOLDTHWAIT demonstrated the anatomical, physiological, and pathological data on which is based the whole system of posture training for which his name is famous. The most entertaining was the film, built up on the lines made familiar by the antics of "Felix the Cat," in which Dr. WILLIS CAMPBELL demonstrated his operation for foot-drop, leaving a most vivid impression of the essential stages of the operation. The most depressing were the group of communications dealing with fracture of the neck of the femur, since most surgeons using different methods gave statistics showing non-union in 30 per cent. of cases, some confessing to a rate as high as 45 per cent. Dr. ROYAL WHITMAN, whose claims to a much higher record of success are well substantiated, admitted that his patients are specially selected. The treatment of open septic wounds after cleansing without suture by a light dressing of gauze soaked in paraffin, according to the method of Dr. WINNETT ORR, is likely to be tried by some at least of those who were obviously impressed by the results obtained. If the same measure of success is achieved in other hands this conference will be remembered for the initiation of a change of great importance in surgical methods.

What may be called, in a wide grouping, orthopædic cases, while alike in their main results, are so widely separated in their various origins that the family doctor, the general surgeon, and the specialist have in a great majority of instances their combined parts to play. Not only is there no line of demarcation between general and orthopædic surgery, but any of the procedures adopted may depend for their correctness and suitability of treatment upon the knowledge and discrimination of the family practitioner as displayed in early diagnosis and wise preventive care. Orthopædic surgery must be based on general surgery, and must recognise and practise the principles of treatment covering the widest field of surgery; thinking in terms of function mainly must not limit the general view. And this was the general message delivered at the sessions of the Orthopædic Congress.

PREVENTABLE BLINDNESS.

AT the present time it is impossible to say with any exactitude what proportion of blindness is due to causes which may fairly be called preventable, but we can point to certain forms of blindness which would have been prevented if known precautions had been taken. In a recent Richard Middlemore lecture,[1] Mr. W. H. FULFORD EALES puts first and foremost cases due to ophthalmia neonatorum. Statistics show that rather more than 5 per cent. of the totally blind owe their blindness to this cause. Among children the proportion is, of course, far higher, as none of the causes of blindness that appear first in adult life affects them. The problem of prevention is threefold. A great majority of the severe cases of ophthalmia neonatorum have their origin in gonorrhœa and infection of the mother with the gonococcus is preventable. Secondly, the responsibility lies with the doctor or midwife, for it has been abundantly proved that when effective precautions are taken at the birth of the infant the eyes are not infected. Thirdly, the public authority should provide facilities for these necessary precautions, and ensure that they are within the reach of all women at the time of their confinement. The next cause of preventable blindness discussed by Mr. EALES is phlyctenular disease. The incidence of what is technically termed blindness from this cause is, it is true, trifling. On the other hand, the number of those who suffer throughout their lives from seriously impaired vision resulting from phlyctenular keratitis is by no means inconsiderable. Since this disease hardly ever

[1] Birmingham Medical Review, June, 1929.

reaches a very serious stage except among the poorer classes, and is undoubtedly connected with bad feeding, absence of sunlight, and overcrowding, it may be said that the main responsibility for this disease lies in the social conditions of our country, and especially of our large towns. Yet it would be a mistake to attribute the whole responsibility to social conditions. It has often been remarked that the Jews, even in the poorest quarters of London, are remarkably free from phlyctenular disease. There may be some racial immunity, but the probable reason is the more nutritious diet, especially in regard to fatty foods, usually enjoyed by Jewish children as compared with other children of the hospital class. The third in order of Mr. EALES'S causes of preventable blindness —also mainly affecting children—is interstitial keratitis, a disease due to congenital syphilis. Here, too, the primary responsibility belongs to the parent from whom the disease is transmitted, but the State also has assumed partial responsibility, and by means of its venereal clinics can do, and is doing, much to lessen the incidence of the disease. Mr. EALES quotes Mr. LINDSAY REA to show that the actual treatment of the infected children themselves by antisyphilitic injections can do far more to induce a cure than is sometimes assumed, so that here some of the responsibility lies with the ophthalmic surgeon. Since interstitial keratitis is only one of several syphilitic conditions which cause blindness, whether in children or adults, it would perhaps be better to enumerate syphilis itself as one of the main causes of preventable blindness. The remaining three of Mr. EALES'S classes are of traumatic origin, whether it be the blindness directly due to injury, as in perforating wounds of the eyeball, sympathetic ophthalmia, or serpiginous ulcer of the cornea. A considerable proportion of industrial injuries to the eye could no doubt be prevented if workmen at trades dangerous in this respect could be induced to wear efficient goggles. How difficult it is to get this carried out was shown by Mr. BERNARD CRIDLAND in a paper [2] read at the recent Congress of the Ophthalmological Society. Of the cases attending hospital for treatment of minor eye injuries, in 70 per cent. he found that no protection had been provided; in 19 per cent. protection was supplied, but not used; and in 11 per cent. protection, although used, was ineffective. Sympathetic ophthalmia is now extremely rare, but it must always be prominent in the mind of the ophthalmic surgeon to whom the main responsibility belongs of diagnosing the condition, with or without the aid of the slit lamp, and making the momentous decision as to when it is safe to allow a patient to retain an injured eye possessing sight and when it is necessary to recommend excision. Serpiginous ulcers also result from injuries to the cornea, often so slight as to be deemed trivial by the patient. The danger lies in the infection of a simple abrasion by the pneumococcus which is apt to be present in the discharge from an infected lacrymal sac. Here the chief necessity is timely and correct treatment, for this form of ulcer, inefficiently treated, may quickly render the whole cornea opaque. At present we are not able to look upon glaucoma and senile cataract as preventable, though blindness from these causes may to a great extent be prevented by early diagnosis and treatment in the one case and timely operation in the other. There remain congenital defects and familiar diseases such as retinitis pigmentosa, and blindness due to septic infection causing cyclitis. The last-named might also be classed as preventable.

[2] Brit. Jour. Ophth., June, 1929, p. 308.

SANOCRYSIN.

So many cures for pulmonary tuberculosis have been advocated, have had their day and have ceased to cure, that scepticism about the value of any new remedy and pessimism about the possibility of the discovery of any effective means for treating the disease have become all too prevalent. Tuberculosis may itself be a dying disease, but it still remains one of the commonest and in its results one of the most tragic of all diseases. If our efforts to save the consumptive are often doomed to failure we can still do something to alleviate suffering and to prolong life. It is now universally recognised that, when the disease is unilateral, treatment by artificial pneumothorax should always be considered and usually undertaken. If an effective collapse of the diseased lung can be secured, hope of a complete recovery may be entertained. Unfortunately adhesions prevent complete deflation in the majority of the cases of unilateral disease. Further, bilateral disease is frequently present when the consumptive first presents himself for treatment. Despite the failures of the past we cannot lightly dismiss any new form of treatment which is applicable to cases of bilateral disease and which may therefore be employed when collapse therapy is impossible. The claim for consideration is also strengthened if such treatment by diminishing disease in one lung may enable us to apply artificial pneumothorax to the other. Both these merits have been claimed for the thiosulphate of gold and sodium introduced by MOLLGAARD under the name of sanocrysin.

Sanocrysin has now had an extensive trial at home and abroad. Its advocates have in the main been cautious in their claims for its efficacy, but there is a consensus of opinion that its action is often beneficial and sometimes strikingly successful. It should also be noted that its chief successes have been obtained in cases of active disease of the so-called exudative type. And these are the forms which, if bilateral, are least influenced by any other form of therapy. Sanocrysin thus differs from tuberculin, a remedy advocated principally in the treatment of the chronic types of disease in which the natural defences of the body often suffice to keep the enemy at bay, whatever form of treatment is applied. LÉON BERNARD and CHARLES MAYER,[1] in a recently published article, give an account of their experience in the treatment of 142 cases of acute febrile disease. They claim favourable results in 43 per cent. of the cases as shown by defervescence, gain in weight, improvement in general condition, and some diminution in physical signs. The clinical improvement was correlated with a change in the radiographic appearances, in some cases denser shadows proving the development of a beneficial sclerosis. In others there was noted a lessening of the extent of the diseased areas or even a diminution in the size of cavities. The improvement noted in patients treated with sanocrysin was far greater than that observed in comparable cases not so treated. In the latter spontaneous arrest of acute symptoms was obtained in less than 5 per cent. of the cases treated in the Laënnec Hospital, in contrast with the figure of 43 per cent. for the sanocrysin series. In many instances subsequent relapses occurred, and though permanent benefit was obtained in others, no claim is made for a definite cure.

Used in conjunction with collapse therapy sanocrysin has something more to its credit. When there is bilateral disease sanocrysin may, in the words of

[1] Presse Médicale, May 29th, 1929, p. 705.

FREDERICK HEAF,[2] just "turn the balance from a bad to a favourable result." Thus L. S. T. BURRELL[3] was able to report improvement in five out of six cases of acute disease of this type, tubercle bacilli being abolished from the sputum in four cases. The experience of many other workers has been similar to that of those quoted. The selection of cases suitable for sanocrysin calls for nice discrimination, and the drug must perhaps be regarded as unsuitable for use in general practice. Apart from the minor difficulties inseparable from intravenous therapy, toxic symptoms may arise as the result of metallic poisoning and close observation of patients under treatment is essential. In the past severe dermatitis, nephritis, and gastro-intestinal inflammation have been caused by too frequent administration or too large a dose. Wider experience has diminished the number of accidents of this kind, and with correct dosage complications of any kind are rare.

THE BRITISH EMPIRE CANCER CAMPAIGN.

THE sixth annual report of the British Empire Cancer Campaign[4] contains an account of the work being done in various institutions subsidised by the central organisation, and also records the achievements of committees in the provinces and in the overseas dominions affiliated to the campaign. Moreover, individuals in receipt of grants are given the opportunity of detailing the efforts made during the year, whether or not these have yet been recorded in scientific journals. An editorial survey (pp. 9 to 18) of the work in progress is illuminating, and would be even more useful another year if it included page references to indicate where the work is more fully described, especially since the place where one looks for an index of subjects and names has been allocated to a list of subscribers to the Fund.

The range of activities is wide, for all possible avenues of approach to this most baffling medical problem are being explored under the auspices of the Campaign. In some institutions the field of inquiry is deliberately limited, the whole of the grant available from the Campaign funds being concentrated on one branch of research. For example, at St. Bartholomew's Hospital, the Marie Curie Hospital, and the Westminster Hospital scientific and statistical studies of radium therapy are being subsidised, at St. Mark's Hospital precancerous conditions in the rectum. At other places, for example the Middlesex Hospital, the attack is more general, three departments being drawn into the battle. In the pathological department attention has been devoted to tissue culture; the virus theory of cancer; the artificial production of tumours; resistance to tumour growth, and the problems of immunity. In the biochemical department methods of sero-diagnosis of malignant disease have been tested (with negative results); the examination of therapeutic substances has been undertaken; and the metabolism of tumour cells has been studied, especially the abnormal carbohydrate metabolism which is a property of malignant tissues. In the radiological department the three main investigations have been the differential action of X and gamma rays, the limiting intensities of radiation influencing tumour growths, and the general physiological reactions caused by penetrating radiation.

[2] Tubercle, July, 1929, p. 449.
[3] Ibid., p. 454.
[4] Presented at the annual meeting held at the House of Lords on July 8th, 1929.

At the Cancer Hospital much attention has been concentrated on the elaboration of new carcinogenic agents and on experimental therapy. Since experience has shown that therapeutic results obtained in transplanted tumours are often inapplicable to spontaneous growths, a strain of mice has been obtained which have a high incidence of mammary cancer. The success reported last summer to the International Conference on Cancer organised by the Campaign (see THE LANCET, 1928, ii., 173) in the production of a chicken sarcoma from injection of normal pancreas could not be repeated, and it is believed that similar failure has attended the efforts of the other experimenters who produced sarcoma from virus-free material. The technique involved in work on the Rous sarcoma is so intricate that no conclusions can fairly be drawn from isolated experiments, and it will be remembered that neither Dr. A. LEITCH nor Dr. J. B. MURPHY made any claims when recording their curious results. The premature and embarrassing clamour with which these were greeted is an indication of the intense desire of the public to hear news of good progress in cancer research. Organisations formed to promote research are faced with the dilemma that any hint of optimism is exaggerated by this desire, while when the cautious tone appropriate to reports of unconfirmed work, however stimulating, is adopted, the public is not impressed with the need for funds. The need is, however, urgent. The total amount of money spent by the Campaign during the past year on research work is approximately £24,000. While the expenditure is steadily increasing, the income from donations and subscriptions is not. Strong local committees, such as those established in Yorkshire, Lancashire, Cheshire and North Wales, Nottinghamshire and Birmingham are creating much interest, and are most valuable assets, but a large proportion of the funds collected in any of these districts is retained for the local research centres. Doctors are in a position to stimulate generous gifts by explaining the need for caution in presenting results and by interpreting to their lay friends the sober yet hopeful messages contained in this report.

Annotations.

"Ne quid nimis."

THE KING.

THE King's departure for Sandringham was fixed for Monday last, but in the morning its postponement was announced and an explanatory statement was issued over the signatures of Sir Stanley Hewett, Dr. Henry Martyn, Sir Hugh Rigby, and Lord Dawson. After giving the reassuring news that His Majesty was not fatigued by the Thanksgiving Service on the previous day, and that his general health was good, they stated that "the condition of the sinus in the right side of the chest has not made satisfactory progress," and that a further examination with X rays was proposed. The last radiological investigation, undertaken not quite four weeks ago, revealed one or two minute sequestra in the abscess cavity which had formed at the site of the rib-resection performed in December. Fresh radiograms have now been taken by Dr. Graham Hodgson, but it is not yet clear whether further local treatment will prove necessary, and until this doubt is resolved the King naturally prefers to remain within easy reach of his medical advisers. In any case there is fortunately no reason for renewal of anxiety.

THE FOURTH IMPERIAL SOCIAL HYGIENE CONGRESS.

THIS Congress, which was organised by the British Social Hygiene Council, was formally opened on Monday in the Livingstone Hall, under the presidency of the Marquess of Linlithgow. The problem of venereal disease being international as well as national, it was fitting that such bodies as the League of Red Cross Societies, the League of Nations, and the International Labour Office should be represented, and the presence of representatives of the Dominions and Colonies testified to the importance attached by them to the campaign against venereal disease. It became evident early in the Congress that the British Social Hygiene Council has established an extraordinarily close liaison with even the most remote corners of the Empire, and the large number of delegates from India was plain evidence of the interest taken in venereal disease in that country. International and Imperial congresses are usually rather impersonal affairs; they suffer from an atmosphere of austerity which the efforts of the most human of chairmen seldom succeed in mitigating. On this occasion, however, the meeting seemed more like a gathering of a clan, whose members were already well known to each other, than a formal congress, and the discussions which followed the papers revealed —one might almost say betrayed—a frankness to be found more often in the bosom of a family than in the precincts of a public building. The chairman's request to the press towards the end of the first meeting that it should withdraw in order to encourage freedom of speech did not, when the Congress was left to itself, yield a crop of candid and lurid speeches. Not a bit of it. Evidently the time has passed when the men and women engaged in the campaign against venereal disease feel that they must maintain a genteel silence, "yea even from good words," and some of the questions put to those who had read papers were as fearless as they were searching. Perhaps the most interesting of these questions was raised by a woman who asked: "What, in your opinion, is the effect of preventive outfits on the morals of the young men on whom they are bestowed?" It was not a question easy to answer offhand, and the person to whom it was addressed evidently thought that discretion was the better part of valour. But later in the same meeting the chairman, Mr. E. B. Turner, when summing up the main features of the discussion, took up the challenge of this question, answering it in unequivocal terms. To give point to his opinion he told the Congress of a young officer who had contracted syphilis and who believed the preventive outfit, giving him the thought that he was safe, had induced him to let himself go. At the meeting on Tuesday morning the discussion largely resolved itself into an advocacy, by speakers north of the Tweed, of compulsory measures in connexion with treatment. Some account of the proceedings will be given in a later issue.

THE CRESCENDO MURMUR OF MITRAL STENOSIS.

THE hypothesis that the crescendo murmur in mitral stenosis is attributable to auricular systole has been generally accepted since Mackenzie drew attention to the characteristic alteration which takes place in the physical signs when auricular fibrillation supervenes. Occasionally, however, even in the presence of fibrillation, the obstructive murmur appears to have a definitely crescendo character. Mackenzie himself referred to such cases, and put forward a tentative suggestion that in them the murmur was produced in a different way—namely, by slight regurgitation at the mitral orifice. This explanation is unsatisfactory, and on reconsidering the whole question Eggleston[1] comes to the conclusion that the apparent crescendo character of the murmur is an aural illusion, depending on the accentuation of the first heart sound. As many previous workers have pointed out, when the heart-rate is slow the obstructive murmur in fibrillation terminates before the end of diastole, and is then diminuendo in character. When, however, two heart cycles follow one another in rapid succession, the murmur fills the whole of diastole, and is continuous with the first heart sound. It is only under these circumstances that it appears to have a crescendo character.

[1] Eggleston, Cary: Amer. Jour. Med. Sci., 1929, clxxvii., 153.

DENTAL SURGEON'S LIABILITY FOR WATER-SUPPLY.

IT seems a little ridiculous that a dental surgeon should be liable to a special charge for water-supply in respect of the water used at the chair in his consulting-room. The Manchester Corporation has, however, recently succeeded in a claim of this kind. The legal position varies in different districts since water-supply is mostly governed by a special Act of local application. The undertakers are usually required to supply houses with domestic water at a charge depending on the rateable value of the premises, and are usually allowed to supply water for trade and non-domestic purposes on such terms and conditions as they think fit—normally by meter at special rates. In 1863 the Waterworks Clauses Act gathered up in one convenient code a set of model clauses which are often incorporated in local legislation about water-supply. Section 12 of the 1863 Act explains that "domestic purposes" do not include water-supply for cattle or horses or washing carriages or horses where the carriages or horses are kept for sale or hire, or supply for any trade, manufacture, or business, or for watering gardens or for fountains or any ornamental purpose. But, as already stated, the law in a particular town depends upon the local Acts which operate in that area, and, even when the Acts are studied, the principles are not too easy to apply. If the courts are asked to distinguish between water-supply for domestic purposes and water-supply for a trade, business or profession, what test are they to apply? Even if a trade or business is carried on in a house, the persons in the house must be entitled to water for domestic purposes. It is not enough, said Lord Dunedin in Metropolitan Water Board *v.* Avery, to argue that a trade is carried on in the premises or that the people who use water on the premises only go there because a trade is carried on. The test is the purpose for which the water is used, not the character of the premises. Lord Dunedin rejected the alternative test, which would suggest that every use of water, however domestic in its nature, which appears as a step (however insignificant) in a trade operation, must be use of water for a trade and therefore not for domestic purposes. In Avery's case the Metropolitan Water Board admitted that they did not charge public-houses at more than the domestic rate, though the nature of the business must involve constant washing of mugs and glasses. It would be absurd, said Lord Dunedin, if a shopkeeper could not even wet a sponge to clean dusty goods without being liable for water at a trade rate. The true test, therefore, is not whether water is used in the course of the trade, but whether the use is in its nature domestic or not.

In the recent Manchester case, the plaintiff corporation contended that the dental surgeon, using the water in the course of his practice, was carrying on a trade or business within the meaning of the local Acts applicable, alternatively that the water used at the dentist's chair was used for other than domestic purposes. Mr. Justice Eve ruled against the corporation on the second of these alternatives, but decided in favour of the corporation upon the construction of the language of the special Manchester Corporation Waterworks Acts because one of those Acts provided that the corporation need not supply any dwelling-house with water

otherwise than by meter or special agreement if any part of the dwelling-house was used for any trade or business purposes. The argument for the defendant that "trade or business" did not include "profession" seems to have been unsuccessful. There is, by the way, a reported case which declares that water used by a medical practitioner for washing a motor-car in connexion with his practice is not used for a trade or business.

THE DIAPHRAGM IN HEALTH AND DISEASE.

MODERN advances in the study of respiratory disease have given the diaphragm a much more important position in medicine than it had 20 years ago when Sir Arthur Keith [1] wrote his chapter on the mechanism of respiration in man. It is to the chest specialist that the stimulus of interest has of late years been due. Advances in the study of lung collapse therapy in all its branches, and radiological technique have enlarged our knowledge, to which the practice of pneumoperitoneum has also to some extent contributed. In a recent monograph [2] with a valuable bibliography, Dr. Karl Hitzenberger, of Vienna, has collected a large amount of information on the diaphragm in health and disease, illustrating his points with helpful radiograms and simple line diagrams. Beginning with its anatomy he summarises what is known of the embryological structure of the diaphragm and goes on to give a long account of the mechanism of its movements, its functions, abnormalities, and diseases. Its movement is by no means the simple piston-like downward and forward action formerly described. There is a potentially different respiratory reserve on the two sides and the costophrenic sinus varies in extent, whilst many modifications of movement are now recognised. The study of these movements in the cat under experimental conditions led Lady Briscoe to the conclusion (THE LANCET, 1926, ii., 57) that in most clinical cases of unilateral phrenic paralysis the paralysis is partial rather than complete.

The whole of Dr. Hitzenberger's monograph resolves itself into a plea for a careful clinical study of the diaphragm in chest disease. Adhesions, paralysis of the phrenic nerve from various causes, the different operations performed on the phrenic nerve, relaxatio diaphragmatica, suppuration above and below the muscle, and numerous other clinical conditions are discussed and figured, but it is clear that much research on the subject is still required. For instance, little has been done to advance our knowledge of intrapleural pressure in normal respiration. Again, the subject of lymphatic drainage of the diaphragmatic regions, including the pleura and thoracic wall, is not as well understood as it might be, though it has an intimate bearing on major operations in the chest.

WAITING AT OUT-PATIENT DEPARTMENTS.

ONE of the subjects discussed at the Baby Week Conference, reported elsewhere in our columns, was the distress caused to mothers and their families by prolonged waiting at out-patient departments. The reality and urgency of the problem was admitted by every speaker, including the chairman, Sir Arthur Stanley, who referred to the tenfold increase in out-patient attendances since the premises at St. Thomas's Hospital were erected. Illustrations of actual hardship were given by speakers representing the Women's Coöperative Guild and the Women Sanitary Inspectors' and Health Visitors' Association, and other bodies. Minor attempts to remedy the evil were described by Dr. A. G. Maitland-Jones, of the London Hospital, and Mr. A. H. Leaney, house governor of the Birmingham General Hospital. Dr. Maitland-Jones, who deplored having to attend to irritated mothers and restless children, set out the system adopted at the children's department of his Hospital, whereby old patients attend in batches at 9, 10, 11, and 12 o'clock respectively, whilst he emphasised the difficulty of arranging to see new cases by appointment and the fact that in teaching hospitals the new cases are used for instruction in methods of diagnosis, failing which the education of the medical practitioners of the future must suffer. To imitate American methods would, he said, entail great expense, the keeping open of out-patient departments throughout the day, larger premises, and an increase in the medical and administrative staffs. Mr. Leaney thought we had much to learn from other countries in this matter. His own view was that out-patient departments should be consultative only, that a social service department should relieve the doctors of clerical work, that new patients should be seen at half-hourly intervals on definite days and old patients in half-hourly batches, that well qualified assistants should relieve their chiefs, and that the doctors should be paid—with a corollary of a much greater demand upon their time. The present practice was indefensible and unacceptable, both to donors and patients. Moreover, the service was no longer really "free" owing to mass subscriptions of workmen and individual contributions levied upon those who could pay. We had in this country the strongest possible foundation on which to build a really good system, and he would like to see an experiment made by giving a large grant to one selected hospital, conditional on the establishment of as perfect a system as possible, with which the other hospitals would gradually come into line. Overcrowding of departments by unsuitable cases was brought out by other speakers at the Conference, and in order to secure their restriction to consultative use the extension of the contract system to the dependents of insured persons was advocated. In some districts already public medical services are having this result. But the fact that a considerable number of hospitals have established canteens for their out-patients is an admission of the reality of the evil. The present time, when the whole hospital service of the country is to come under review owing to changes in local government, may be opportune for a study of the defects in our service, in the light of the experience of other countries. All are agreed as to the want of a better system. From what source the funds for its provision are to come will remain to be considered after some representative committee makes its report.

EARLY OPERATION FOR ACUTE SUPPURATION OF THE MIDDLE EAR.

ONE of the most difficult decisions which the otologist is called upon to make is whether and when to operate on the mastoid in severe acute suppurative otitis. The complications of this condition which endanger life are usually the result of mastoiditis, though the possibility of labyrinthitis and an endocranial spread of infection from the tympanum must be remembered. The usual practice is to open the antrum if swelling, severe pain, tenderness, and fever persist for more than three or four days after a free discharge is established with or without paracentesis of the membrane. But Prof. Ludwig Haymann,[1] of Munich, is a strong opponent of operation at this stage, and claims that a large series of cases of this kind under his care have cleared up and become soundly healed without operation. In his opinion the only indication for opening the mastoid at the beginning of an acute otitis is the certainty or strong probability of some endocranial complication such as meningitis or sinus thrombosis; the recognition of such a complication is sometimes extremely difficult, and in doubtful cases it is better to operate too early than too late, but this necessity is exceptional. Pain, tenderness, and even high fever, he says, are not of

[1] Further Advances in Physiology. Edited by Dr. Leonard Hill, London, 1909.

[2] Das Zwerchfell im gesunden und kranken Zustand. Vienna. Pp. 206. M.18.

[1] Münch. med. Woch., June 7th, p. 947.

themselves indications for operation in the early stage of the disease; and he furthermore believes that, in spite of radical exenteration of the mastoid, early operation offers no guarantee against late complications. On the other hand, Prof. Haymann regards the outlook as very different when the acute stage of the middle-ear inflammation has passed and there are symptoms pointing to localisation of suppuration in the mastoid. Here the prospect of recovery without operation is much less and the danger of endocranial complications very much greater. An exact time-limit is impossible to fix, but he considers that the period when mastoid symptoms acquire a serious aspect is somewhere after the second week from the onset of the acute middle-ear inflammation. Again, the persistence of a profuse creamy purulent discharge, lasting, say, six weeks, is an indication for operation in the absence of all other symptoms. He draws attention to the group of cases in which all symptoms are absent except that the membrana tympani remains somewhat thickened and the diminution of hearing persists; in these cases, usually due to infection by *Streptococcus mucosus*, extensive bone disease is often found at operation, particularly where the patient is over 40 years of age. Prof. Haymann supports his conclusions by statistics of 791 cases of acute otitis treated on these principles. Among them there were 25 deaths attributable to disease of the ear, and of these 7 were in patients brought to hospital in an advanced stage of neglected disease. These results are so good that his contention deserves the careful consideration of otologists.

THE HEALTH OF THE NAVY.

As the Statistical Report of the Health of the Navy for 1927 has now appeared [1] it can be stated that the illness and mortality-rates per 1000 in the three Services in that year were as follows: Navy, cases 479·05, deaths 2·15; Army, cases 467·7, deaths 2·42; Air Force, cases 467·8, deaths 4·15. The Navy health report provides evidence of considerable improvement, for it claims the lowest death-rate from all causes yet recorded, and a death-rate from disease (1·36) equal to the lowest, which was in 1925. The death-rate from injury (0·76) is notably low, being about a quarter of that of the British seamen in the merchant marine in the same year. There were in the Navy in 1927 92,230 men, and, as we have stated, the incidence of disease and injury per 1000 was 479·05. There were more numerous cases of influenza and respiratory diseases than in the previous year, but many fewer of the infectious fevers, and it is notable that there were 36 fewer cases of tubercle of the lung (151 in all). Invaliding was less at 13·8 per 1000 (18·12 in 1926), the chief causes being errors of refraction 234, ear disease 199, and tubercle of the lung 159. For refusing surgical operations only 37 were this year invalided, 10 fewer than in 1926, which shows the increasing confidence of the men in their medical officers. Deaths were also reduced to 2·15 (from 3·18 in 1926), the chief causes of death being drowning 27, injuries 25, and tubercle 20. Enteric fever cases were slightly increased to 18 (2 deaths); one of the cases was that of a medical officer who contracted paratyphoid in a laboratory. Influenza (2562 cases with 1 death) attacked chiefly the Home Station, the incidence there being three times as great as in the fleets abroad. Pneumonia and rheumatic fever slightly increased. Pulmonary tuberculosis again decreased, and especially at ages above 25. Under 25 the tuberculous cases invalided were 62 this year as compared with 67 last year; over 25 they were 97 as against 114. Ages are classified this year in five-year groups, as they should be in all such statistics if the figures are to be readily compared with those published by other organisations. But why are the "cases" in Table III. (p. 12) given as 143, and in Tables I. and II. as 151, as also on p. 72? Last year they were 187 everywhere. Tubercle of the lung shows more cases in the "service afloat" (1·7) than on the Home Station (1·45); its incidence on ships' cooks is remarkable (4·45). Cases of venereal disease have slightly decreased; local disinfection with calomel cream and mercuric iodide soap is always available, recreation is encouraged, and warnings are seriously given. The period of treatment for gonorrhœa has decreased by two days per case. More dental officers were available, so more teeth were conserved—63,716 against 58,527. We miss in these brief statistical reports the often interesting stories of medical officers about their experiences—so noticeable a feature in the past—but we are this year given account of an outbreak of beri-beri in a sloop doing an extended tour in the Persian Gulf in summer. Four Europeans and four natives were affected. Fresh vegetables could not be procured, there was little fruit, and much of the food came out of tins. Disinfection was carried out weekly, unpolished rice was issued, dried peas were soaked for 48 hours before cooking (it is not stated that they were allowed to germinate), and yeast was given. Only teetotallers were affected, and only the local beer is mentioned as having had a possibly curative influence on the disease. It will be recalled by students of naval medicine that fresh vegetables and beer are supposed to have maintained the health of Lord Hawke's fleet in 1759 before the Battle of Quiberon Bay Among the cases then spoken of as scurvy were there perhaps some that were really unrecognised beri-beri? Much research work was done in 1927 at the Royal Naval Medical School, Greenwich, on oxygen analysis, swimming-bath water, regeneration of air in submarines, and vaccines; also what is described as "a lot of laborious" experiments on the testing of disinfectants. The Marines at headquarters are still excluded from the summary of the total force (pp. 13 and 72), but their invalids are included on pp. 20–23. There is still no sanitary report on the cadets at Dartmouth, and we are sorry to see that the price of the Report has been raised.

[1] H.M. Stationery Office. 1929. Pp. 147. 5*s*.

"WITHIN THE RANGE OF MEDICAL SERVICE."

AN inquiry has been held at Manchester upon the question whether treatment of varicose veins in the leg by intravenous injection of a sclerosing solution is within the range of medical service as set out in Article 43 of the Medical Benefit Consolidated Regulations of 1928. This treatment was administered in May, 1928, to a female insured person by her panel doctor of Manchester, and both the local insurance committee and the local medical committee were in agreement in holding the view that it was outside the range of medical service. The matter being referred to the Minister of Health, Mr. E. H. Tindal Atkinson (Barrister-at-Law), Dr. E. Collingwood Andrews, and Dr. Alexander Forbes were asked to inquire and report. For the purposes of this inquiry the treatment is thus briefly described.

The vein is punctured by a hypodermic needle attached to a syringe and into the vein is injected a pre-determined quantity of sclerosing solution. The solution has the effect of forming an adherent clot in the vein which ultimately results in obliteration. A number of injections may be necessary in accordance with the length of the vein requiring treatment. Particular care has to be exercised to avoid the entry of air into the vein and to ensure that the solution shall pass only into the vein and not round it or into the adjoining tissues. The most ordinary solutions in use are sodium salicylate and urethane and quinine and urethane.

No question was raised as to the possession by the panel doctor of special skill qualifying him to administer the treatment and the referees assumed that he did in fact possess such special skill. On behalf of the Minister it was contended: (1) That the operation is not difficult or dangerous. (2) That as compared with the taking of blood for the Wassermann

test the operation can as certainly be regarded as within the range of medical service. (3) That knowledge of the technique can be acquired from text-books and requires no particular training either in the actual administration of the treatment or in the judgment requisite to decide on the advisability of its use. (4) That the treatment, while admittedly modern, has become so well known that any ordinary practitioner should in a proper case be prepared to adopt it. (5) That the risks of any adverse effects are negligible in the light of statistical knowledge. On behalf of the insurance and panel committees it was contended: (1) That a considerable degree of skill is required at least equal to that necessary for the injection of salvarsan or its substitutes, particularly also where ulceration is present. (2) That at the present time there has not existed sufficient experience of the treatment and its results to justify its inclusion in the range of medical service. (3) That there are many contra-indications against the treatment—e.g., it is dangerous in the case of a pregnant woman or in certain cases where heart disease or high blood pressure is present or in the case of patients who have some idiosyncrasy to quinine or salicylate. (4) That the standard of skill in the Manchester locality is such that the treatment may fairly be regarded as special and not of such a character that it should be carried out by the ordinary insurance doctor. (5) That statistical knowledge as to after-effects is not sufficiently established.

The referees found for the Minister. While admitting that injection treatment of varicose veins is modern, they note that it is now practised with success in a very large number of cases. The technique is not difficult and any panel doctor should be able to decide whether the patient is a fit subject for the treatment. There may be no substantial difference in the actual technique of the two injections, but the referees thought the possible risks attendant upon salvarsan treatment to be such as to render it not fairly comparable with injection for varicose veins. Two of the referees, however, felt that when the treatment was actually applied in Manchester in May, 1928, it might then have been regarded as in an experimental stage, although this was no longer true at the time of the inquiry.

THE AMERICAN COLLEGE OF SURGEONS.

THE nineteenth annual Clinical Congress of the American College of Surgeons will be held in Chicago on Oct. 14th and the four following days under the presidency of Dr. Franklin Martin. All departments of surgery—general surgery, gynæcology and obstetrics, and the main special branches of surgical practice—are represented in the programme, and demonstrations will be given in the laboratories attached to the hospitals and schools of the four great universities of the city, the Northwestern University, the University of Chicago, the University of Illinois, and the Loyola University. On the first day of the session the President-elect, Dr. Merritte Ireland, Surg.-Gen. U.S.M.C., will be inducted into office and deliver the annual address, after which Mr. D. P. D. Wilkie will deliver the Murphy Oration.

An important feature of the meeting will be the Hospital Conference, in connexion with which great efforts have been made to present short papers and practical demonstrations dealing with many questions of hospital efficiency, and it is hoped that round-table discussions on the various problems will be of service not only to the scientific staffs of the institutions, but to hospital trustees, boards of management, and directorates. The Conference will open as soon as the College is in session, its proceedings taking place in the grand ballroom of the Stevens Hotel, where the general headquarters of the Congress will be established.

Attendance at the Congress will be limited to a number that can be comfortably accommodated in their groups at the various clinics, so that it will be necessary for visitors to register in advance their intention to be present. The executive body in Chicago has for chairman Dr. L. Kretschmer, and secretary Dr. Loyal Davis.

COMPOUND COMPOSITE ODONTOMES.

THE study of odontomes is one of the most fascinating branches of dental pathology. Mr. A. T. Pitts has recently described to the Royal Society of Medicine [1] three of those rare types known as compound composite odontomes which, under Sir John Bland-Sutton's classification, were called compound follicular odontomes. The first case occurred in a boy aged 15, and the odontome was found in the region of the right upper canine and the adjoining premolars. It appeared as a hard irregular swelling about the size of a filbert nut. Clinical examination, even with the aid of a radiogram, did not enable Mr. Pitts to determine whether it was a complex or a compound composite odontome. At the operation, however, 18 separate denticles were discovered. No definite capsule could be found surrounding the whole tumour; but some of the denticles appear to have had an investing membrane, whilst others were embedded in fibrous tissue. One of the calcified masses contained enamel, dentine, and cement. The dentine was well formed; but the enamel, as so often happens when it is found under pathological conditions, was granular. In another denticle, from which a section was obtained, no cement was found. The largest piece consisted of four or five denticles fused together in an irregular mass. In all of the larger denticles radiograms showed evidence of the presence of a pulp canal. The second case was that of a boy aged 3 years and 8 months, who presented a hard rounded swelling in the region of the right upper deciduous incisors which had failed to erupt. A mass of nine denticles could be seen in the radiogram; and, in this case, a correct diagnosis was made before the operation. The missing deciduous central and lateral incisors were in close relation to the denticles which were enclosed within a capsule and the latter was continuous with the tooth sac of the first deciduous incisor. The permanent incisors were lying above the swelling. The largest denticle consisted of a tritubercular crown with a single stunted root. The other denticles resembled conical teeth. The third case occurred in a boy aged 14, and this presented six supernumerary teeth in the left upper first premolar region. The boy gave a history of having himself removed four supernumerary teeth from the same region, previous to his visit to a dental surgeon for treatment.

It is a moot point whether this last case should be classed with odontomes at all. Many pathologists would not have placed it here. But the line of demarcation between abnormally formed teeth and odontomes is by no means clearly defined. Long ago, Albrecht taught that tumours are malformations, and that it is not always possible to distinguish new growth from development. Prof. G. W. Nicholson also regards tumours as aborted organs. Mr. Pitts himself puts forward several suggestions. First, he raises the question of the possibility of odontomes erupting like ordinary teeth. There seems to be no reason why they should not do so, provided the conditions correspond with those which are essential for the eruption of a tooth. Undoubtedly, many odontomes do pass through this process; but others remain embedded within the jaw, or only become exfoliated as a result of suppuration and necrosis of the overlying bone. When the epithelial remnants of the tooth band (which Mr. Warwick James has described as the determining factor in directing the tooth to its final position in the jaw) remain in their correct relationship, the odontome may erupt like a tooth. But the aberration which leads to the formation of a tooth tumour often involves these epithelial structures; and then, if the odontome

[1] Proceedings of the R.S.M., 1929, xxii., 659.

becomes exposed to the surface it may be a process of exfoliation rather than one of eruption. Mr. Pitts also refers to the manner in which one type of odontome may blend with another type. Many pathologists who have investigated these tumours recognise this fact and it is this which makes the classification of some cases very difficult. In his first case four or five denticles were fused together in one mass, but so long as the minute structures of denticles are not inextricably mixed up with one another there is no reason for considering this mass to be a *complex* composite odontome. Some years ago Bland-Sutton described the case of a woman who "spat out" a mass, consisting of dental tissues fused together, which appeared to be a collection of independent denticles united by cement and might well be included under the group called compound composite odontomes, rather than under the complex composite odontomes. On the other hand, some of the individual denticles contained within a compound composite odontome may be of the complex composite variety. With regard to the third point which Mr. Pitts raises on these cases, it seems evident that an odontome may arise from the original tooth band; or may be due to an aberration of the deciduous or the permanent tooth germ, or to that of a supernumerary tooth. Very few compound composite odontomes have been fully recorded, and all who are interested in the study of odontomes must feel grateful to Mr. Pitts for the very careful manner in which he has described these cases.

XIIITH INTERNATIONAL OPHTHALMOLOGICAL CONGRESS.

IT will be timely to remind any who propose to attend this Congress, which will be held at Amsterdam from Sept. 5th to Sept. 13th, that if they will send their subscriptions now it will greatly facilitate the work of the National Committee. We learn that 700 members have already been enrolled and that 232 communications, covering all branches of ophthalmology, have been promised. It is certain, therefore, that those who find themselves unable to be at the meetings will find it extremely useful to possess the Transactions, which promise to form a compendium of recent work in ophthalmology. So those who cannot go to Amsterdam will reap a real advantage by becoming members of the Congress, when they will be supplied with a copy of the Transactions as soon as they appear. The subscriptions (25 Dutch florins = £2 2*s*. English money) should be sent to Dr. H. M. Roelofsz, Director of the Incassobank, Heerengracht 531, Amsterdam.

ON the recommendation of the Minister of Health, the King has been pleased to appoint Dr. Bedford Pierce to be a temporary Commissioner of the Board of Control.

Lord Dawson has been re-elected President of the Royal Society of Medicine for another year The hon treasurers for the year 1929–30 are Dr. A. M. H. Gray and Mr. W. Girling Ball; the hon. secretaries Mr. E. K. Martin and Dr. George Riddoch; the hon. librarians Dr. William Bulloch, F.R.S., and Mr. H. W. Carson; and the hon. editors Dr. Hugh Thursfield and Mr. J. Swift Joly.

Sir Albert Levy has set aside £250,000 to form a fund for the support of hospitals and other charitable objects. The whole of this sum, plus interest, will be distributed "in 25 yearly instalments," the total amounting to about £400,000, of which £100,000 has already been allocated for hospital purposes. A division of one twenty-fifth part of the capital and income will be made on May 1st and Nov. 1st of each year, and communications may be addressed to the secretary of the Albert Levy Benevolent Fund at 5, St. James's-place, London, S.W.1. Sir Albert is treasurer of the Royal Free Hospital, to which he has lately made two gifts of £50,000 each.

The Clinical Interpretation of Aids to Diagnosis.

A Series of Special Articles contributed by Invitation.

XXXVII.

CHARTS OF FRACTIONAL TEST-MEALS.

PART II.*—ABNORMAL CURVES.

Charts Showing High Acidity.

IN Fig. 3 and Fig. 4 are given examples of typical charts showing high acidity. It will be seen that in both of them there are *at least* two readings of free HCl above 50. When this is encountered it is always true to say that the case is *probably* from a pathological subject, although, as was noted last week, such a chart is occasionally encountered in a healthy person. Fig. 3 shows a rapidly rising curve of acidity with rapid emptying of the stomach, which is more frequently encountered in cases of duodenal or juxtapyloric peptic ulcer than in any other condition. It is, therefore, correct for the pathologist to report that the chart is suggestive of such a condition. It must be emphasised that neither this nor any other type of chart can ever be conclusive evidence of the presence of an ulcer.

Fig. 4 differs from the preceding one in that the curve of acid (both free and total) rises slowly without perhaps reaching such a high concentration as in the last condition. It is typical of what is sometimes called the "climbing curve"—i.e., there is no drop in the acid in the later stages, probably because spasm or obstruction of the pylorus is preventing the free regurgitation of alkali through the duodenum. Such a chart is characteristic of many cases of gastric and juxtapyloric ulcer, and suggests that without such a degree of irritability of the stomach as is present in cases producing Fig. 3 there is some impediment to the pyloric outlet.

In Fig. 5 is shown a chart of the "Plateau" type which is characteristic of pyloric obstruction. Such a chart would be prolonged for three hours or longer, depending on the patience of the subject and observer, and if the stomach is completely emptied at 2½ hours, the amount of contents recovered at that moment will probably considerably exceed 100 c.cm. Such a chart is diagnostic of pyloric obstruction, and it will further be noted that in such cases the concentration of HCl is seldom so high as in the cases discussed previously, and that there is a greater disparity between the curves of free and total acidity owing to the presence of organic acids resulting from fermentation.

Low Acid Charts.

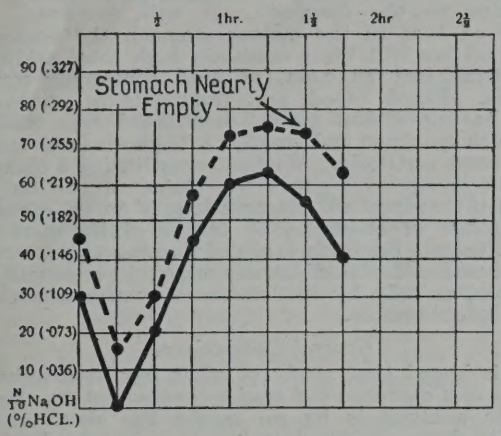
Fig. 6 is a typical example of complete achlorhydria of the "benign" type. There is complete absence of HCl and total acidity is also low. Emptying is usually rapid and may be very rapid. It would be beyond the scope of the present article to discuss at length all the possible interpretations or causes of such a chart, but the following points must be emphasised:—

1. It occurs in about 5 per cent. of normal healthy men.
2. It is present in probably every case of pernicious anæmia.
3. It is occasionally, but somewhat uncommonly, present in cases of cancer of the stomach.

Apart from such cases of complete achlorhydria, cases are sometimes met with in which there is a trace of free HCl at one or two readings only. Great hesitation must be observed before considering any such chart as indicative of a pathological condition. It is a very common finding in perfectly healthy people who are nervous or who have been upset by

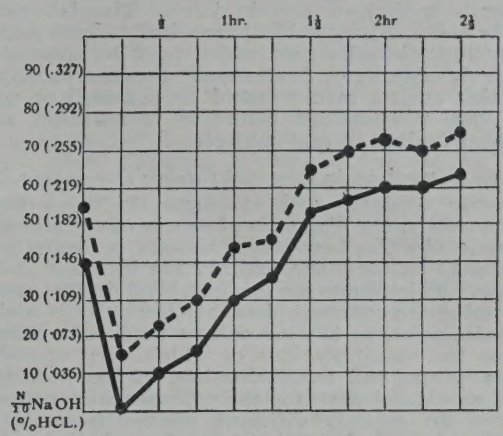
* Part I., on the Interpretation of Charts of Fractional Test-meals, appeared last week.

FIG. 3.



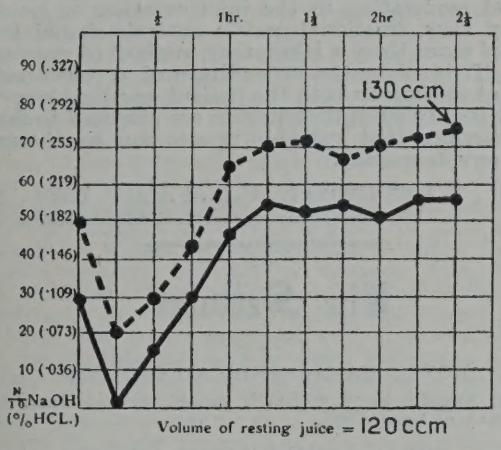
Showing a rapidly rising curve of high acidity, suggestive of duodenal or juxta pyloric peptic ulcer.

FIG. 4.



Showing a slowly rising curve of high acidity, suggestive of some impediment to the pyloric outlet.

FIG. 5.



The "plateau" type of curve, characteristic of pyloric obstruction.

FIG. 6.

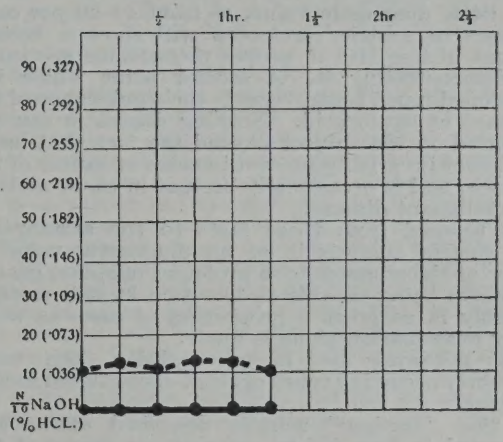
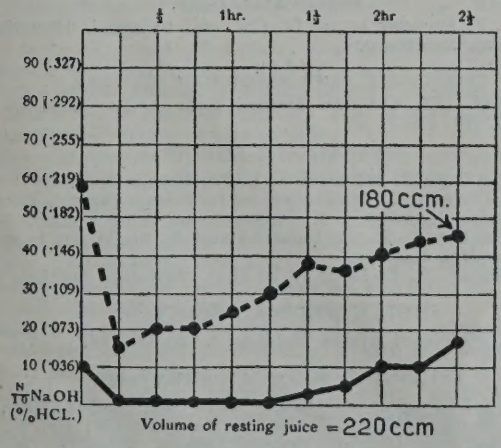


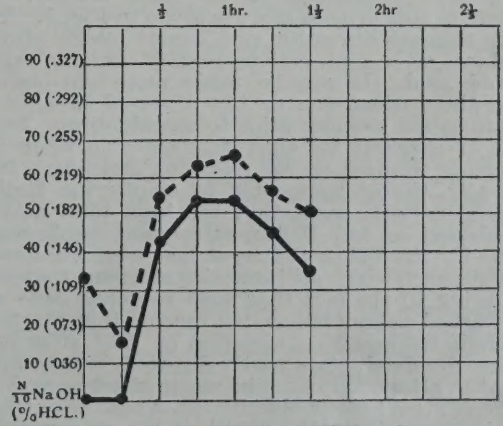
Chart typical of complete achlorhydria.

FIG. 7.



Showing very low free HCl but a considerable concentration of total acidity.

FIG. 8.



Showing free secretion of acid with rather rapid emptying.

the difficulty of swallowing the stomach-tube. In my opinion the most that can ever be said of such a chart is that it suggests some interference with the proper secretion of gastric juice. The laboratory worker is never justified in proceeding to give reasons for such an interference, which may be congenital, acquired, organic, or functional. Further, it may be said that such a result should be obtained on more than one examination before it is accepted as a constant finding in any subject.

Charts Found in Cases of Gastric Carcinoma.

Gastric analysis finds perhaps its most useful application in the diagnosis of cancer of the stomach. Reference to the text-books reveals a diversity of opinion as to what the findings are in cases of this disease. This is due to the fact that gastric cancer does not give a constant picture either to the clinician, the radiologist, or the laboratory worker, it being a disease the manifestations of which vary according to the nature and exact situation of the neoplasm. Small growths obstructing the pylorus will necessarily produce an entirely different picture from diffuse growths of the body of the stomach, and the leather-bottle stomach, now generally accepted as malignant, will give a picture to the analyst entirely different from that seen with a growth which is discharging a profuse mucoid secretion.

Controversy with regard to the findings of gastric analysis of cases of carcinoma of the stomach usually centres round the question whether or not free HCl is found. It may be said at once that this criterion is of little diagnostic value, as from 40–60 per cent. of cases of gastric carcinoma will show a certain amount of free HCl if proper precautions are taken for demonstrating it. A second point which has occasioned much controversy is the significance of the presence of lactic acid. Nothing dogmatic can yet be stated on the subject beyond the fact that lactic acid is not invariably present in cases of cancer of the stomach, and is occasionally present in cases without any malignant disease.

To proceed from these facts to the assumption that gastric analysis is of no diagnostic value in cancer of the stomach is a profound mistake, gastric carcinoma being capable of detection by this method probably in as great a proportion of cases as when X ray examination alone is made.

The following are, in my opinion, the most frequently occurring types of chart encountered in this condition :—

1. The "benign" achylia described above and illustrated in Fig. 6. In cases of carcinoma of the stomach, this chart will differ from that seen with pernicious anæmia, owing to the fact that (*a*) blood tends to be present in the fasting juice and in later specimens, (*b*) a profuse secretion of mucus is often found, and (*c*) emptying is not, as a rule, as rapid as in cases of true benign achylia.

2. Charts showing low or absent free HCl, but a considerable concentration of total acidity. An example of this type of chart is given in Fig. 7. The fasting stomach content in such cases is nearly always abundant, often foul, and frequently contains partly digested food. It can be made more obvious by giving the patient one or two charcoal biscuits to eat late in the evening prior to examination. Fragments of charcoal are then demonstrable when the stomach is emptied on the following morning. It is frequently almost impossible to empty the fasting stomach in these cases, and the high total acidity with absence of free HCl in subsequent specimens is due to the fact that the meal has been swallowed into a stomach which still contains stagnant contents. It is owing to the fact that such contents have not been washed clear of the gastric mucosa that the test-meal fails to provoke a secretion of HCl after it is swallowed. Food, often partly digested, is frequently present in all specimens. The whole chart is really a picture of gross pyloric obstruction, a condition which is almost invariably the result of a new growth in that region.

3. Fig. 8 is taken from a case of cancer of the stomach in a young patient. It shows a free secretion of acid with rather rapid emptying, and by itself gives no clue to the diagnosis. It will, however, be observed that in the fasting stomach the contents show no free HCl, but a relatively high total acidity; in actual fact 40 c.cm. of fluid containing much mucus, altered blood, and fragments of charcoal, and having a foul smell, constituted this fasting stomach specimen and enabled a diagnosis to be made with some certitude. Without constituting a characteristic group as regards the shape of the curve, cases of this type are characteristic of an appreciable percentage of examples of cancer of the stomach and illustrate the importance of warning the observer in advance of the diagnosis which it is sought to confirm, as only by this means may the necessary data be obtainable.

General Conclusions.

It is hoped that study of what has been written above will convince the reader that whilst fractional gastric analysis is by no means the short-cut to definite diagnosis which it has been imagined to be in certain quarters, it is, if carefully carried out, an extremely valuable aid to the diagnostician. It differs from the majority of laboratory procedures in that it is essentially an inexact method from which conclusions can only be drawn by paying attention, not to chemical accuracy alone, but also to careful technique in the collection of the specimens and critical moderation in the interpretation of results. In my view, fractional gastric analysis should be a *clinical* more than a laboratory method of examination. It involves the expenditure of a considerable amount of time by both the patient and the observer, and it is only when both parties are prepared to make this sacrifice that valuable results can be obtained with any frequency.

T. IZOD BENNETT, M.D., F.R.C.P. Lond,
Physician to Out-patients, Middlesex Hospital.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Comdr. F. G. Goble is placed on the Retd. List with rank of Surg. Capt.

ROYAL ARMY MEDICAL CORPS.

Lt.-Col. A. C. H. Gray to be Bt.-Col.
Maj. C. M. Drew to be Bt. Lt.-Col.
Maj. N. Cantlie is placed on the half-pay list on account of ill-health.

ARMY DENTAL CORPS.

Capt. W. R. Wotton to be Maj.

TERRITORIAL ARMY.

Maj. J. Ramsay to be Lt.-Col. and to comd. 12th (2nd Western) Gen. Hosp.

TERRITORIAL ARMY RESERVE OF OFFICERS.

Lt.-Col. (Bt. Col.) D. Dougal from Active List, to be Lt.-Col. (Bt. Col.).

ROYAL AIR FORCE

Group Capt. J. McIntyre to be Air Commodore.
Wing Comdr. J. MacGregor to be Group Capt.
Squadron Leader P. M. Keane to be Wing Comdr.
Flight Lts. J. K. R. Landells and E. D. D. Dickson to be Squadron Leaders.
Flight Lt. E. E. Isaac to be Hon. Squadron Leader.

INDIAN MEDICAL SERVICE.

Maj. Mohamed Abdur Rahman to be Lt.-Col.

COLONIAL MEDICAL SERVICES.

The following appointments have been made: Dr. C. J. Boyd, Medical Officer, Federated Malay States; Dr. W. G. MacNaughton, District Medical Officer, Fiji; Dr. H. A. MacMillan, Medical Officer, Kenya; and Mr. L. L. Burton, Colonial Surgeon, St. Helena.

Special Articles.

THE FUTURE OF MEDICAL PRACTICE.

AN ADDRESS BY LORD DAWSON.

IN the course of an address delivered when distributing prizes to students at the London Hospital Medical College on June 28th, Lord Dawson said:—

It is only natural that you should be dazzled by the fascinating unfolding of all that radium is telling us, following as it does upon the steady progress of discovery in biochemistry, in radiology and other sciences; but the very dazzle of this discovery has dangers, because I would remind you that you are going to be men of action; you are going to come in contact with the sick, and all the results have to be judged by the criteria of the bedside. In order to learn disease as it affects mankind you must study mankind. Disease is not a standardised product; for, thank heaven, man preserves his individuality in sickness as well as in health; otherwise it would be an uncommonly dull world to live in. Therefore, if you are taking a history and are not a little bored at the tedium, and inclined to say "Why cannot the Lab. do this for us?" my urging to you is "Don't." Take the trouble. For every moment of it you will be rewarded. There you are learning how symptoms vary and what they stand for, not only in the abstract, but in *that* patient. You are gaining insight and perception and not only knowledge but understanding, and you are thinking of life not in terms of remedies but in terms of healing.

Now I come to what I think must interest you all most—namely, the future. That is the direction in which all eyes should look, for we live in an astonishingly interesting world which is going to show great changes. I would beg of you not to listen to the croakers who can be heard all around. The people who croak are those who are mistaking change for decadence. The great need of England to-day, as I see it, is that young men and women should think, and, having thought, help to direct the course of the nation. That is true of the profession of medicine as it is of other walks of life. The teaching of medicine in Britain to-day is very well done, but we do not give the world a very good opportunity of seeing that it is well done. If visitors come they see, but we do not put our goods much in the shop window—perhaps not enough. For research we are rich in brains, and increasingly rich in opportunity. All schools and universities are fully alive to the importance of the extension of knowledge; and I would like to say here that in the coördinating of effort and for encouragement we owe a tribute to the Medical Research Council.

It is to the field of general practice that we need to pay attention, for it would be a sorry day for any country were general practitioners to become weak in their work or their influence. This is now a danger in certain countries of the world.

The practitioner is one of our protectors against the "stunt" specialist. Only the other day an American lady said to me, "If I get an acute sore-throat I have no one to tell me what to do with it. Three specialists come in one after the other; one with a laryngoscope, the next to take my blood, and the third to take a culture, and by the time they all report I am either better or dead."

Again, it is to the interests of the community to identify the practitioner with the health of the people and to give him this career.

I will put certain questions to you. Is it not a fact that practice is becoming grouped around occupations and social needs, and less located in the home? The needs of the expectant mother, care of the child, the treatment of tubercle, are all examples of the classification of practice round needs. The uprising of medical and welfare services in the hives of industry is a striking development which deserves the attention of all doctors who have their lives in front of them. Think what these places offer. They are provided with clinics, with hospitals, and even with laboratories. There they look at the work-people, and test their fitness for this or that kind of work, thereby not only securing better output, but saving an unjust burden being put upon the backs of men whose physique is unsuited to bear it. You have only to go through the wards of this hospital, and time and time again you see a poor man about 40 or 50, nothing else wrong with him but this—and a grave wrong it is—that he has been a blacksmith or a lighterman when nature meant him to be a tailor. That fitting as regards employment—fitting the round peg into the round hole—is a duty that should come under the mantle of the medical profession.

Further, is it not plain that more clinic and hospital provision is needed? You cannot afford to allow this question to rest. By a recent Act of Parliament the local authorities throughout this land are taking on a new chapter in their work and responsibilities in regard to the sick. They have the power to found clinics and hospitals. I wish to put this before you: Clinics and hospitals must not only be thought of in terms of great teaching institutions like this. They are required everywhere—though varying in size and the simplicity and complexity of their functions—and to some of them general practitioners should have access. Thus there would follow what we want to see: fewer visits and better opportunities for good work at each visit.

I beg of you, therefore, to give these questions your careful attention, and to see to it that in the shaping of the health policy of this country regard is had to them. It is said that the problem of general practice, in its relation to hospital provision and the problem of how to treat patients of limited means, has been solved in Germany and the United States. I tell you it has not been solved anywhere. It remains for this country to do so, but success in that direction will depend upon the vigour and the worth of the younger medical men who are coming to the fore. By the securing of better opportunities, by responsible contact with the health organisation of local government, I think you will find that the centre of gravity of your work will move towards prevention and early diagnosis, and that you will rise up as the interpreters of health to the people.

MEDICAL PRACTITIONERS AND MOTORISTS.—In our last issue (p. 50) we referred to the *Manchester Guardian's* recent questionaire on payments to hospitals by motorists injured in road accidents. The same newspaper has since published replies received from medical men practising in or near Manchester showing "that the skilled attention which the general practitioner gives to victims of motor accidents too often goes unrewarded and even unacknowledged." One writer reports having treated 13 cases without receiving any fee. Another says that he is seldom paid by casual persons involved in motor or motor-cycle accidents. Moreover, it is not usually worth while to take action to compel payment, for it would cost as much as the actual cost of treatment. Another doctor finds that when the patient is not one of his own clients payment for services rendered is frequently very difficult to obtain, especially from motor-cyclists, who are often uninsured against accident. The same experience applies to all casual street accidents, however caused. Additional replies from hospitals include one from the Royal Infirmary, Glasgow, where during 1928 the number of in-patients treated suffering from motor accidents was 591 and the average cost per patient was £7 16*s.* and out-patients treated numbered 608. No charge was made for these cases, and very little was contributed by any injured person voluntarily. The infirmary suffers from having to treat these accidents to the amount of approximately £4600 per annum. The number of motor accidents admitted to the Cardiff Infirmary in 1928 was 233, and the total number of days in hospital was 4168. The amount contributed was only £138 and the total cost to the infirmary calculated at 8*s.* a day was £1667.

THE BRITISH AND AMERICAN ORTHOPÆDIC ASSOCIATIONS.

THE British and American Orthopædic Associations held a joint meeting in London during the first week in July.

The meeting was largely attended, many notable orthopædic surgeons contributing papers and taking part in the discussions. The proceedings in London opened on July 4th, when Prof. E. W. HEY GROVES, President of the British Orthopædic Association, took the chair and introduced Dr. FRED ALBEE, who gave an address as President of the American Orthopædic Association. He referred to high-speed tools in bone surgery and dealt at some length with the anatomical, physiological, and pathological principles on which their use is based. The Robert Jones Medal was presented to Mr. E. P. Brockman for an essay on Club-foot, after which Prof. E. W. Hey Groves (Bristol) resigned his place to Dr. Albee while he himself opened the discussion on

Treatment of Fractures of the Neck of the Femur.

Prof. HEY GROVES said that the most likely sources of error in treating these cases were: (1) to suppose that spontaneous impaction was adequate on the strength of X ray evidence alone, since this evidence is often fallacious; (2) to attempt reduction in elderly patients before the initial shock had passed off; (3) to take it for granted that such fractures are uncommon in the young and do not carry the risk of non-union early in life; (4) to think that it is not worth while reducing the fracture and splinting it adequately in old patients. He then asked those about to take part in the discussion to answer the two questions: What are the end-results of the methods in present use; and what are the best methods, and if more than one, when is each most applicable?

Dr. ROYAL WHITMAN (New York), the originator of the abduction treatment which is now recognised all over the world as the best conservative method, followed Prof. Hey Groves and pointed out that his own cases are largely selected ones, so that his statistics could not be regarded as typical. In answer to a question, he said he could only remember one case of non-union among all those he had treated, and his cases included persons up to 86 years of age. He showed lantern slides illustrating his method and deprecated the modifications introduced by various surgeons, who have overlooked the importance of its details. He stressed particularly the need for traction on the limb, to draw it out to the same length as the sound one, before any abduction was attempted, and also of maintaining full internal rotation and of making the abduction exactly equal to the maximum obtainable on the sound side. This implied that the limbs must be held symmetrical until the end of the application of the plaster. He insisted on the value of team-work and showed a photo of an old lady to whom he had applied the plaster-spica in 7½ minutes under ethylene anæsthesia. His routine was to keep the patients in bed for one month, with frequent changes to the prone position and attention to the skin of the back under the plaster. He then allowed them up on crutches in the plaster for another two months. At the end of three months from the application of the plaster, it was bivalved and two or three months careful physiotherapy was given with re-education of the muscles and mobilization of the joints in recumbency; finally, a walking-splint was used till the end of the first nine to twelve months from the accident, under which time firm union could not be expected.

Dr. P. D. WILSON (Boston) demonstrated a steel nail with cutting triangular shaft, which Dr. Smith-Peterson had designed and had used for several years to secure fixation of these fractures. He advocated early open operation in all cases in view of the high percentage of cases of non-union even with the best conservative methods, and he stressed the danger of permanent stiffness of the knee after use of the long Whitman spica.

Sir ROBERT JONES (Liverpool), while recognising the excellent results obtained by those who advocated surgical intervention, emphasised the importance of standardising and popularising some conservative method which was applicable under the less favourable conditions met with by general practitioners and surgeons in country areas, for only so would the general level of results improve.

Dr. ALBEE, Dr. WILLIS CAMPBELL (Memphis), and Mr. BLUNDELL BANKART (London) referred to the poor blood-supply of the head of the femur in producing non-union even under the best treatment. Other speakers deprecated the lack of any uniform plan of treatment of these cases in our big general hospitals, where some cases are splinted for a week or two only, which is obviously inadequate, while others are kept in plaster many months, with no attention to the condition of the muscles or joints and no supporting apparatus when the plaster is removed from the limb. It emerged from the discussion and the statistics presented by a number of speakers that, even with the best methods known at present, non-union is to be expected in about 30 per cent. of cases; some speakers placed it as high as 45 per cent. All those who advocated surgical intervention agreed that it was essential to expose the site of fracture and reduce the displacement before attempting to insert any fixation material.

In summing up, Dr. ALBEE emphasised the advantages of his method of using an accurately fitted screw of living, autogenous, vascular bone and quoted experiments which showed that the boiled beef-bone was not well tolerated. Prof. HEY GROVES in reply said that the advocates of steel and live bone-screws produced arguments which cancelled one another and he remained convinced of the virtues of his simple and speedy method with the beef-bone screw.

In the afternoon Prof. V. PUTTI (Bologna) gave a short paper on the

Early Diagnosis and Treatment of Congenital Dislocation of the Hip.

This paper was illustrated with radiograms of single and double dislocations in infants under one year, including one a day old, and also illustrations of the abduction cushion, by which he has gradually secured reduction in six to twelve months without any forcible manipulation. He dwelt particularly on the chief points in the X ray diagnosis—i.e., shelving of the roof of the acetabulum, absence, or poor development, of the bony nucleus of the femoral head, and increase of the distance between the upper end of the femur and the floor of the acetabulum, even when the neck is not raised above Shelton's line. As regards clinical diagnosis in infants under one year of age, he held that the medical practitioner ought to be at least as observant as the mother, who often noticed inequality of the skin folds on the inner side of the thighs; asymmetry of the outline of the hip regions on the two sides; deepening of the groin hollow; shortening of one limb; and possibly undue mobility of one hip, or its limitation by tight adductors. The presence of any of these features demanded an X ray examination. Prof. Putti remarked how satisfactory in bringing early cases to light had been the intensive propaganda undertaken in Italy among practitioners, nurses, and midwives, and the compulsory training of medical students in orthopædics.

Treatment of Common Spinal Conditions.

Dr. J. E. GOLDTHWAIT (Boston) gave an address on the Basic Principles involved in the Treatment of Common Spinal Conditions as well as in the Function of the Viscera. In the short time allowed

him he covered all the main features of the subject, including the influence of bodily types on the production of sprains and the significance of anatomical variations in relation to symptoms, these variations being illustrated by radiograms as well as drawings of many anatomical specimens. He also discussed the mechanics of the circulation and respiration, which he illustrated by fluoroscopic tracings of the movements of the diaphragm under different bodily conditions. He pleaded for a thorough examination of the whole patient stripped in cases with symptoms referred to the spine or abdomen, and for thorough X ray examination of the chest, including heart and diaphragm, as well as vertebræ.

On July 5th a discussion on

Reconstructive Surgery in Paralytic Deformities of the Leg

opened with a paper by Dr. MELVIN HENDERSON (Mayo Clinic), which was read in his absence by Dr. BRUCE GILL (Philadelphia). The communication supplied an interesting review of the methods which have been successively used to try to give stability to a lower limb in which paralysis of one or more muscles has upset the normal balance and led to poor function, with or without deformity. Dr. Henderson's figures of the varieties of operation and their results in 195 cases during the four-year period 1924–28 showed that the total percentage of operations was diminishing, as the result of more efficient early treatment, while the proportion of arthrodesis to other methods was steadily rising. [Both these features were noticeable also in most of the other statistics presented.] The essential message of Dr. Melvin Henderson's experience was that if once the delicate muscle balance of the normal lower limb is permanently disturbed, it cannot be restored by any rearrangement of the remaining muscles, nor can gravity be resisted for long by slings of artificial material or even of paralysed tendons; it is necessary to resist the progress of deformity by fusing the three main joints of the tarsus—i.e., the sub-astragaloid, astragalo-scaphoid, and calcaneo-cuboid—while certain cases demand removal of the whole scaphoid and displacement of the lower part of the foot backward on the astragalus, so as to shorten the part of its axis in front of the leg bones. Most of the subsequent speakers agreed with him that in suitable cases the transplantation of active tendons, or the use of paralysed ones as slings are a valuable supplement to the arthrodesis operation. With judicious selection of cases about 90 per cent. of good functioning feet can be obtained by the method.

Mr. LAMING EVANS (London) gave an interesting review of the progress of surgical treatment of paralyses in the lower limbs. He dwelt at some length on the management of cases of complete, or almost complete, paralysis of the quadriceps, stating that a transplanted biceps, an antagonist of the quadriceps during movement, can never be got to extend a flexed knee against gravity, whereas the sartorius, a synergic muscle, can do so. Subsequent speakers pointed out that the object of the transplant was to steady the knee-joint during standing, in which function the quadriceps and hamstrings normally contract simultaneously and, therefore, the transplant might very well restore balance; Dr. Royal Whitman, a staunch advocate of the transplanting operation, finds that it does so in all properly selected cases. All speakers condemned arthrodesis of the knee for a flail knee in childhood, though it was agreed that the operation might have its use for certain adults in special occupations. Mr. Laming Evans also referred to the risks of gangrene and shock in attempts to correct completely by operation severe flexion deformities of the hip and knee; these should be straightened gradually by apparatus after the operation. He found transplantation of the toe extensors into the metatarsal heads for clawing a disappointing operation, as have many other surgeons, and he advised in preference astragalectomy by Whitman's method, which with care and a wise selection of cases he found to give excellent results.—Dr. WHITMAN himself then spoke in support of his operation.—Dr. F. R. OBER (Boston) next emphasised some points which make for success in tendon transplantation operations, and referred to the need for combining them with arthrodesis in many cases.—Dr. L. MAYER (New York) showed an ingenious cardboard model illustrating all the stages of such an operation on a foot.

Dr. LE MESURIER (Toronto) gave some interesting facts about his work with Gallie on tendon-slings, and pointed out that slipping of the tendon is likely to occur if its smooth surface is not scraped away, and that union is best in cancellous bone. He said that the pioneers of the method have now abandoned it for drop-foot and valgus deformities, since the sling is unable to resist gravity, but it is still found useful for some varus conditions, as gravity helps to maintain their correction; it is also useful as a temporary measure in young children, whose bones are not yet developed sufficiently for arthrodesis. Most speakers agreed that the fusion operations gave the best results when done late, though it was mentioned that adults may complain of persistent pain after the operation, whereas this is practically unknown in children.

Dr. WALLACE COLE (St. Paul, Minn.) gave some interesting statistics on a series of 224 foot arthrodesis operations; only two had failed to secure bony union, while only 11 had required further operation; 80 per cent. had given excellent results. He showed clear diagrams of the principles of the chief types of operation in use and in his later cases was tending to favour the three-joint arthrodesis.—Mr. NAUGHTON DUNN (Birmingham), one of the pioneers of this type of operation, pointed out the danger of getting part of the correction of the equinus by downward angulation at the mid-tarsal joint, which gave a persistently painful foot. A number of speakers supported from their experience the practice of stabilising the foot by some type of bone operation before tackling the muscles themselves.

Clinical demonstrations were given at St. Bartholomew's, Guy's, King's College, and St. Thomas's Hospitals, and a visit was paid to Alton.

The morning of July 6th was occupied by a series of short papers, each of which represented a great amount of careful clinical work and research.

Disabilities from Low Back Derangement.

Dr. ELLIOTT BRACKETT (Boston) read a paper on the Treatment of Disabilities Resulting from Low Back Derangement, illustrated by lantern slides. Dr. Brackett pleaded for study and treatment of the lower part of the back with its three critical joints of the sacro-iliac and lumbo-sacral junctions as one mechanism, because it was impossible for a lesion of any one of the three to occur without altering the strain on the other two. He asked for further study to elucidate the mechanism of the production of pain in the region, which is by no means clear, and pointed out that there are no absolutely characteristic symptoms for each different lesion in this region; pathological conditions may give the same clinical picture as strain. He also asked for a careful study of the systemic condition of each patient and for a critical estimation of the relative importance of various factors in different cases. Among the factors to be weighed were trauma (strain of subluxation); anatomical abnormalities of the spine, such as sacralisation of the fifth lumbar vertebræ, a horizontal position of the sacrum, or abnormalities of the articular facets and of the laminæ and the presence of pathological processes such as tuberculosis or rheumatoid and osteo-arthritis. Finally the lesion in one or all of the three joints had to be localised. As regards anatomical variations Dr. Brackett dismissed sacralisation of the fifth lumbar as of no clinical significance; but he regarded a horizontal position of the sacrum as a factor making for constant, abnormal strain on ligaments and muscles

and therefore of serious import. He reminded his audience that normally none of the joints in question allow much movement, but that they act as shock-absorbers. In the normal attitude of good posture, such as Dr. Goldthwait had demonstrated to them two days before, the shocks were reduced to a minimum, whereas alterations in the mechanical balance at once increased the strain on structures, and as soon as it became more than they were designed to meet symptoms arose. It was necessary to find out by careful X ray examination whether anatomical peculiarities were present, then to consider whether they had any effect in increasing the strain on the joints, and finally to treat this region, and indeed the whole body balance, as one mechanism.—Dr. A. STEINDLER (Iowa) emphasised this point.—Dr. T. D. ADAMS (Boston) remarked that the anatomical abnormality had existed from birth, whereas the symptoms came on late, so that they were likely to be due to some superadded pathological condition.—Dr. BRACKETT, in reply, said that he considered that the patient with an abnormal bone condition was likely to be slower in recovering and more subject to relapse, because he started with a smaller margin of safe reserve.

"No Dressing" Treatment.

Dr. WINNETT ORR (Lincoln, Nebr.) next gave an interesting paper on the details of his "no dressing" treatment of infections of bones and joints. He said that the method was based on the principles originally laid down by the British pioneers, Hunter, Hilton and Lister, whereas modern surgery with its fomentations, irrigations, drainage-tubes, and frequent changes of dressings had got away from Lister's original and valuable technique, as well as from the application of rest which was so necessary to healing tissues. He illustrated his paper by lantern slides of cases showing remarkable results from his method, in a case of neglected osteomyelitis of the upper end of the femur, a compound fracture of the ankle in a very heavy, flabby subject, and two compound fractures of the shaft of the femur, one of which was septic and ununited after it had been plated at another hospital. In all these cases skiagrams were shown demonstrating good bony union and photographs of the patients proved the wounds healed or superficial and the general condition excellent. These and many others had been treated by the method of widely opening all septic cavities, cleaning them out with iodine and alcohol, and packing with gauze saturated in paraffin, which provided at once pressure and drainage; firm dry dressings were then applied without any stitching of the wound, and finally a plaster hip spica in any lesion of the lower limb. If one hip was affected, both were included in the plaster, so as to give absolute fixation of the joints in the affected region. No dressing was done under four weeks and often not till eight weeks, when the plaster and dressing were both changed under anæsthesia in the operating theatre. With this treatment, Dr. Orr said, the temperature falls, pain goes, and toxæmia diminishes within a few days of the initial drainage and splinting. In his view the failures of our present methods of treating acute and chronic bone sepsis are due to: (1) an inadequate primary operation, by which he did not imply that one should open indiscriminately into healthy bone areas when draining osteomyelitis; (2) failure of subsequent immobilisation, both by inadequate splinting and frequent interference; (3) secondary infection during repeated dressings under conditions not providing for absolute asepsis.

Prof. HEY GROVES, in closing the discussion, said that Dr. Orr's paper would have read like a fairy tale, so revolutionary was his method, but his personality and lantern slides were so convincing that surgeons would feel bound to give his method an extensive trial. He asked the profession to differentiate between the two great groups of cases, which led to chronic bone sepsis—i.e., soiled compound fractures, which it was well known could be disinfected by careful operative technique, and the group of late osteomyelitis, which was septicæmic in character and allowed of no primary sterilisation.

It was evident from Dr. Orr's paper and from the remarks of the surgeons who followed him and have used his method with increasing success, that, as with other innovations which have proved useful, attention to the minutest details is necessary in order to achieve results similar to those of the originator.

An Operation to Check Drop-Foot.

Dr. WILLIS CAMPBELL (Memphis, Tenn.) next gave a cinematographic demonstration of his operation for forming a pyramidal bone spur at the back of the os calcis in order to check drop-foot, and also of patients walking well after the operation. Excellent radiograms were also shown. Dr. Campbell pointed out that most of the cases needed a three-joint arthrodesis of the foot combined with the spur, for which the necessary bone could be got from the slices taken from the tarsal bones. He found the results to be best when the spur was united both to astragalus and os calcis, and when it had a blunt apex which would not fracture.

Mr. R. OLLERENSHAW (Manchester) showed radiograms of a series of successful cases in which he had employed Dr. Campbell's method.

Dr. STEINDLER next read a paper on the

Compensation Treatment of Scoliosis,

in which he pointed out that the methods used by him were not very different from those formerly used in the so-called corective treatment. His aims, however, were very different, for it was his object to imitate nature in producing gradually a restoration of the body balance by compensatory curves placed close to the pathological curve, which, though it tended to be reduced by absorption in these secondary curves, could not be abolished entirely in structural cases. Dr. Steindler showed an interesting series of results of treatment in which the severity of the lesion prevented any dramatic cure, but the patients were maintaining their corrected stance over periods of four years and more, with or without a brace. He pointed out that, although the fusion operation might be called for in certain paralytic cases, it should never be performed until the maximum possible compensation had been attained, otherwise the strain on the fused area would be excessive and fracture would occur. Dr. Steindler laid stress on the point that in scoliosis the bone lesion is secondary and the failure of muscle-balance primary, and therefore the aim of treatment should be re-education of muscles under the most favourable conditions—e.g., recumbency or support from a brace. He objected to the traction methods because they gave the muscles no time for compensation. He considered that about 50 per cent. of the cases that came to a surgeon were suitable for this method, which takes about four years for its completion. The unsuitable cases included the very severe paralytic ones and also congenital and rachitic patients.—Dr. BRACKETT drew attention to the importance of educating the patient to know when he is in the correct position, so that instinctive retention of this position might develop.

Pre-hallux as a Cause of Flat-Foot.

The final paper of the session was contributed by Dr. F. C. KIDNER (Detroit) on the Pre-hallux as a cause of Flat-Foot. He showed skiagrams with this accessory scaphoid present in various stages of development, and described the cases in which flat-foot and an abnormal insertion with loss of power of the tibialis posticus accompanied the bone abnormality. His patients were cured by insertion of the tendon into the under surface of the scaphoid and retention in plaster for six weeks fully inverted.

Dr. D. P. WILLARD (Philadelphia) reported some similar cases.

A Reception at the Royal College of Surgeons of England.

On the evening of July 4th, a reception was given at the Royal College of Surgeons of England, when the President and Lady Moynihan received a large company of guests in the Museum Hall. Sir Arthur Keith, the Conservator of the Hunterian Museum, then gave a demonstration with the epidiascope of museum specimens illustrating healing and disease in prehistoric times. In a deliberately colloquial manner he spoke of the primitive origins of surgery, pointing out that the oldest known pathological specimen in the world was of an orthopædic nature, inasmuch as the femur of the famous Java man exhibited excellent manifestations of myositis ossificans. But the main part of his amusing address centred round the wonderful specimens of early Egyptian osteology—specimens which were delved from the cemeteries submerged during the construction of the Assouan dam. And here he paid a warm tribute to Prof. Elliot Smith's studies of anthropology, directed alike to Egyptian relics, the art of mummification, and the early history of civilisation.

The introduction of music formed an innovation in College receptions, for in the hall of the College the Marguerite Wortham Orchestra rendered an excellent musical programme. The museum, the conservator's offices, and the Council room were thrown open for the exhibition to the visitors of the Hunterian relics, and recently added preparations of special interest to orthopædic surgeons. The portraits by Reynolds, Lawrence, Romney, Hogarth, and other masters provoked admiration in the Council room, while in the library refreshments were served throughout the evening.

The Dinner.

The members of the joint meeting dined together at the Café Royal, London, on the evening July 5th, Sir Robert Jones presiding and a very large company being present, including, by special invitation, King Manoel of Portugal.

The Chairman, having given the loyal toasts of His Majesty the King and the President of the United States, called upon Prof. E. W. Hey Groves to propose the toast of the American Orthopædic Association. Prof. Hey Groves first rendered the tribute of British orthopædists to American colleagues for an immense stimulus received in their work from America at the outbreak of the war, a stimulus for which they still had remained grateful. Comparing to-day the orthopædic work in the two countries, in regard to institutions, he said, whether special or attached to general hospitals, one main difference between the countries must be alluded to—apparently in America the workers had no money problems whatever. The need for money being stated it arrived in America, but in this country voluntary institutions have to beg for their bread, while there are other difficulties than pecuniary ones placed in the way of research, for example, the activities of quacks. Of these, the speaker admitted, America also had their quota, indeed such was their supply that they exported them. In conclusion he said that the links of union between America and England forged during the war would hold and the chain would grow stronger. He coupled the toast to which he was speaking especially with the name of the President of the American Orthopædic Association, Dr. Fred Albee, whom he thought of as "a contriver of jig-saw puzzles," but he wished to mention two other prominent orthopædists whose personal connexion with the joint meetings must have impressed everyone, namely, Dr. Royal Whitman, whom he described as "though no longer young in years, yet a storm centre of debate and an admirable examinee," and Dr. J. E. Goldthwait, who was a "wonderful combination of wide knowledge and special technique."

Dr. Goldthwait interposed here by request and read a telegram which in the early stages of the war had been received in America from the British authorities containing an urgent request for six base hospitals and 20 orthopædic surgeons. The material and the men were immediately dispatched, said Dr. Goldthwait, who pointed out that, while it was a special honour to orthopædic surgery that the first surgical service to be required was orthopædic, the circumstances of the telegram established the American in-comers in an impregnable position from the very beginning, and in that position those 20 orthopædic surgeons, with their entourage, were maintained by two Governments.

Dr. Albee, disclaiming any intention of making a long speech, echoed Prof. Hey Groves's words as to the stimulation which the orthopædic surgeons of each country had received from the common direction of their interests and objects. In personal reference to the Chairman he said that 21 years ago he had worked with Sir Robert Jones at Liverpool, and could testify to the wide influence which he had exercised for good over orthopædic surgery throughout the world, and he considered that this influence was much advanced by the able and sympathetic manner in which he had always taught his subject. Dr. Albee closed by alluding to the value of such international meetings as they were now holding, and reflected that the long journeys which had to be undertaken might be of considerable use. Despite the inevitable trials and fatigues of the journey from America to England, he said that the members of the American Association had during its course acquired a valuable knowledge of each other and had thus added to their ability to derive benefit from a confrontation with their British colleagues. He then read the following resolution, which was passed at the Executive Session of the American Association on July 5th:—

"The American Orthopædic Association, in Executive Session assembled, takes this opportunity of expressing to British Orthopædic Association its appreciation for its gracious hospitality and its lavish expression of good fellowship. Closely bound by every kind of human tie to our British colleagues, we express the hope that this delightful meeting may be the forerunner of other similar happy reunions, and that we may anticipate an early opportunity of greeting our British colleagues in a similar way in the United States. May this resolution serve as the means of carrying a truly fraternal message of gratitude."

Sir Robert Jones proposed the health of King Manoel, who was so closely associated with the orthopædic work undertaken during the war at Shepherd's Bush. King Manoel, he said, had not only been a valuable friend from practical and social points of view, but in many ways the idea of curative workshops might be attributed to his invention. He spoke of the cheery and unaffected friendship which King Manoel had displayed while at Shepherd's Bush with the staff, working out the methods of treating the injured and mutilated.

King Manoel, in reply, thanked Sir Robert Jones, Dr. Goldthwait and many of his friends in the room, both British and American, for their recollection of the humble worker who during the period of the war tried to do the best that circumstances permitted to him for the mitigation of sufferers. Although, he said, he could no longer be considered to have any direct or practical connexion with orthopædic surgery, the friendly bond between the workers in that specialty and himself would always remain as a recollection and a solace.

Sir Robert Jones then proposed the health of the guests, coupling the toast with the name of the Editor of The Lancet.

Sir Squire Sprigge returned thanks briefly, when Dr. Goldthwait proposed the health of the Chairman in terms of which the audience showed their approval by drinking Sir Robert Jones's health with musical honours.

TUBERCULOSIS ASSOCIATION.

ANNUAL PROVINCIAL MEETING, CAMBRIDGE, JUNE 27TH–29TH.

(*Continued from p. 40.*)

III. The Correlation of X Ray Findings in Pulmonary Tuberculosis with the Symptoms and Physical Signs.

Dr. J. WATT (Godalming) being in the chair,

Dr. A. E. BARCLAY (Cambridge) dealt with the physical nature of X rays; the causation of the shadows seen in a radiogram of the chest; the voltage, the type of tube, the character of the radiations, and the distance at which a chest radiogram should be taken. Standard conditions, he said, were essential, but most radiologists are troubled by such fundamental things as big variations in town main voltages. Such variations play havoc with standardisation, particularly in the use of hot cathode tubes, where a slight change in the heating filament made so much difference in the quality of the rays. Longer distances were now used in chest work, giving less distortion of the picture and more definition. The best type of film should show no detail in the bones of the thorax. Stereoscopy as a routine measure was not particularly valuable. Screening of the chest before taking a film was invaluable, because it gave information as to the movements of the diaphragm, and to the presence of localised areas of deficient air entry. The shadows at the root of the lung were caused mainly by the blood in the pulmonary vessels. Again, there was not so much air at the roots, and on this account the shadows are denser. Personally he was inclined to lay little or no stress on relatively slight increases in the root shadows, provided that there was nothing else to arouse suspicion. Two points which made him take notice were an area of suspected defective air entry, especially if the root shadow seemed to be particularly enlarged towards this area and secondly, any alteration in the nature of the movements of the diaphragm. These features could only be seen on screen examination. The irregular branched striæ spreading out from the root were, in his opinion, due almost entirely to blood-vessels.

It was, of course, in the detection of early pulmonary tuberculosis that X ray examination was of the greatest importance. Advanced disease was usually quite patent clinically, yet frequently more extensive disease was found radiographically than the clinical signs led one to suspect. But, on the other hand, there was a certain percentage of cases in which the radiogram showed no disease when the clinical evidence of its presence was quite strong. The obvious and plausible explanation of the failures in the clinical signs of disease was that the disease was deep-seated, whereas physical examination was more concerned with superficial changes. But why certain cases should fail to give radiographic evidence was not so easy of explanation. Radiographic evidence was naturally confined to macroscopic changes, and if only a few alveoli were affected we were not likely to detect the change. The typical woolly mottling of a tuberculous focus represented not only the disease itself, but a surrounding region filled with the exudate of reaction. He suggested that, in these cases where the radiogram failed to reveal any change, the reaction was deficient. In spite of these exceptions, his faith in the value of an entirely negative X ray examination conducted by a careful radiologist was very high. Radiologists were not justified in calling a shadow tuberculous except on the ground of experience. Exactly the same appearance could be produced by any other low grade localised infection with an inflammatory reaction about it. He held very strongly that the radiographic and clinical examinations should be conducted by different observers. The clinician and the radiologist together would arrive at an opinion that would be neither a clinical nor an X ray diagnosis, but something that really mattered—i.e., *the* diagnosis. It was only by teamwork that we could make progress.

Dr. S. VERE PEARSON (Mundesley) said that the subject was a wide one and could not easily be covered briefly. Great advances had been made in recent years but there was still much to learn. He recommended a study of the writings of Wessler and Jaches, Alexander and Beekmann, and the publications of Dr. Kenneth Dunham. He thought there was a tendency to-day to over-emphasise the practical deductions to be drawn from X ray findings in pulmonary tuberculosis. After all the symptoms of a patient were more important than either ordinary physical signs or X ray pictures. It was most important, too, to realise that good and constant standards must be set up in making films of chests, because it was easy, if a radiologist were really clever in altering the circumstances of exposure of a chest, even to produce the picture of a cure attained in a few minutes! He thought this subject of the co-relation of X ray findings with symptoms and physical signs might best be illustrated by him by showing some slides of chests where there was an exceptional correlation one way or the other. It was well known, for example, that severe laryngeal cases and cases complicated by chronic alcoholism often had paucity of ordinary physical signs in the chest, yet X rays revealed extensive disease. He then showed amongst other slides (1) a picture of a very big apical cavity in the case of a man who had been repeatedly examined over many weeks without ever finding any of the ordinary signs of excavation. (2) A couple of slides showing what appeared from X ray examination to be a severe and extensive case compared to one of a much slighter nature; but when the symptoms were compared the former had no fever or other severe symptoms, whereas as in the latter case it was necessary to keep the patient in bed for months and the severity of the illness was great. (3) Two films of the same chest at an interval of nine months looking almost exactly the same, yet from emaciation and feverishness the patient had in the interval progressed to decent body-weight and capability for walking exercise up to ten miles a day. (4) A slide which showed a recent lesion in the left lower lobe producing relapse, which lesion was unsuspected before the X ray film was taken, which saved the patient from having a right-sided artificial pneumothorax attempted, and some other slides where the physical signs were described and were somewhat unusual in their correlation to the X ray appearance or the clinical condition.

Dr. G. T. HEBERT (London) said there could be no two opinions concerning the value of X ray examination to the clinician. Unsatisfactory films, it was true, were unreliable and misleading, but for the purposes of the discussion we must assume that first-class apparatus and technique were used. If X ray findings always agreed with the results of ordinary clinical examination they would be of no service to the clinician. When confronted with a doubtful case of tuberculosis the physician had to make up his mind on four problems—viz., the presence or not of tuberculosis, its extent and character, its activity and the prognosis. In the correlation of X ray findings with physical signs all cases could be divided into four groups: (1) When symptoms and signs were negative and X ray findings negative. This group was usually a large one, and included most of the contact cases. (2) When symptoms and signs were negative and X ray findings positive. If X ray examination was carried out as a routine in this group of cases it would probably be found now and then that one which the clinician would have passed over as non-tuberculous showed a definite radiological lesion. (3) When symptoms and signs were suggestive but the X ray findings positive. Most patients with pulmonary tuberculosis had passed the incipient stage when they first presented themselves. They could be diagnosed with a fair degree of certainty by symptoms, signs, and sputum examination, and for the purposes

of diagnosis a radiogram was unnecessary. If sputum examination were negative a positive X ray examination would confirm the diagnosis. (4) When symptoms and signs were suggestive of tuberculosis but the X ray findings negative. It was possible for definite tuberculosis, proved by more than one positive sputum examination, to exist without definite X ray changes, but such instances were very uncommon. Hæmoptysis, pleural effusion, and spontaneous pneumothorax were presumably tuberculous manifestations, but in a considerable percentage of these cases no radiological evidence of disease in the lungs was discoverable. He pointed out that in the non-tuberculous chronic interstitial fibrosis, the abnormal physical signs were usually very marked, whereas the radiogram frequently showed little or nothing wrong. This contrast in the signs and X ray picture he considered to be proof of the non-tuberculous character of the lesion. In tuberculosis the radiogram provided very good evidence of the extent of the lesion. As a rule the disease was more extensive than the physical signs indicated. In regard to activity of the disease, radiological examination was not of much value. It was true that active lesions had certain characteristics, but these were often obscured when active and old foci were intermingled, and on the whole the question of activity was better decided on purely clinical grounds. Concerning the question of prognosis by means of the radiogram, if the condition of the patient was good, he liked to see well-developed mottling. On the other hand, when symptoms, signs, and pyrexia were prominent features but X ray examination showed relatively little, he inferred that the prognosis was bad.

In summing up he made the following points: (1) The clinician would derive most benefit from X ray examination in the province of diagnosis. (2) It was often useful in excluding tuberculosis as well as for confirming clinical evidence which was not quite strong enough to be conclusive. (3) It was essential in cases of initial hæmoptysis, after an idiopathic pleural effusion, or spontaneous pneumothorax, in cases of probable laryngeal tuberculosis, and in some cases of non-pulmonary tuberculosis. (4) It was essential before artificial pneumothorax treatment was commenced and at intervals during the treatment. (5) It often helped in other cases when, for instance, symptoms were severe and the signs slight, or vice versa. (6) It was liable to be misleading when it showed a generalised lesion or indefinite when a homogeneous opacity was present which might be due either to fluid or consolidation. (7) Every clinician should study the X ray films of his cases, because it was only by experience that the significance of X ray findings be discovered and their help utilised to the best advantage.

Discussion.

The CHAIRMAN agreed that while radiograms were useful, they were not infallible. The clinician and the radiologist should work together.

Dr. ERNEST WARD (Paignton) spoke of the variations in the ability of radiologists to take good chest films. He asked what was the significance of pleural rings and cart-wheel shadows.

Dr. GEORGE JESSEL (Lancashire) said it was most valuable to compare X ray findings and physical signs with autopsies, and in this respect the large hospitals had a great advantage over the tuberculosis officer. He thought that diagnosis had not become more accurate in recent years but that there had been a great increase in interest and that treatment on the whole was better. He uttered a warning against depending too much on radiology and neglecting the symptoms and physical signs.

Dr. W. STOBIE (Oxford) was of the opinion that the interpretation of the films should be left to the clinician. Radiograms were part and parcel of our diagnostic equipment, but he thought that all these questions about the correlation of physical signs were highly speculative in the absence of autopsies. He maintained that it was impossible to make a prognosis from a radiogram.

Dr. W. ARNOTT DICKSON, Dr. W. H. DICKINSON, and Dr. F. A. L. HAMMOND also took part.

IV. Gas Poisoning and Gunshot Wounds of the Chest in Relation to Tuberculosis.

Dr. F. W. BURTON-FANNING (Norwich) being in the chair,

Surgeon-Commander A. FAIRLEY (Chemical Warfare Research Department, Porton) spoke on the after-effects of war gassing in relation to the incidence of tuberculosis, on which he said his mind was still open. The clinical side came under the Ministry of Pensions. With much that had been published on the matter in other countries, his department found itself in general agreement. Owing to the fact that warfare gas was a surprise weapon introduced against modern rules of warfare, it had received a vast amount of unfavourable press attention throughout the world. As a result, gas was being blamed for more dire iniquities than had ever before been associated with any war weapon. It was credited for many ailments for which it was in no way responsible. This was borne out by the fact that in the American Army there were only 70,552 gas casualties, but the number of applications for compensation greatly exceeded that number. A Board of American medical officers had examined over two thousand cases claiming disability from gas poisoning. They concluded that gas victims, irrespective of the type of gas used and the severity of attack sustained, showed no marked predisposition to active pulmonary tuberculosis, or to reactivation of a healed or quiescent pulmonary lesion. Further, gas victims presented little evidence of material destruction of lung tissue. French, German, and Swiss authorities had issued reports with similar conclusions

In the differential diagnosis of pulmonary tuberculosis from the late effects of gas poisoning, Hawes of Boston had stressed that a general appearance of robust health associated with marked symptoms was against tuberculosis, that the lung complications resulting from gas poisoning were usually basal and not apical, and that, following gas poisoning there was apt to be a marked increase in nervous symptoms of every kind. In order to trace any connexion between war gassing and tuberculous or any other disability it was of fundamental importance that the record of war gassing should be unimpeachable.

Dr. G. BASIL PRICE (Ministry of Pensions) dealt with the incidence of pulmonary tuberculosis both after gas poisoning and gunshot wounds of the chest, He was able to show that a marked contrast as to the incidence of tuberculosis existed between the two types of case—viz., that whereas tuberculosis was a rare sequel of gas poisoning, in gunshot wounds of the chest it formed a small but definite percentage which was likely to increase as time went on. During a detailed review of the literature he quoted Sergent's conclusions in 1925 that gassing by itself did not provoke tuberculosis; that where tuberculosis followed gassing, active or latent tuberculosis must have been present; and that if at a later date gassing was followed by tuberculosis, the occurrence was accidental. Dr. Price found in a series of 200 cases in which there had been a definite history of gas poisoning only nine were diagnosed as pulmonary tuberculosis. Of these nine cases in only two was there a probability that the condition was directly caused by the gassing. In a series of 50 cases of wounds of the chest he found pulmonary tuberculosis in 37 of them. The tuberculosis was regarded as a direct sequel of the trauma in 29 cases. He concluded that whereas gassing is unimportant in the later development of pulmonary tuberculosis, in gunshot injuries of the chest (of all types, surface and penetrating), tuberculosis develops later in a small but appreciable percentage. He considered that surface injuries not involving the thoracic cage did not appear to be an ætiological factor in the onset of

tuberculosis. When the pulmonary tissue had been definitely injured, and especially when a foreign body was retained in or near the damaged area, activation of tubercle might occur even after a prolonged period.

Discussion.

Dr. A. SANDISON (Ministry of Pensions) said that the mystery of tuberculosis had been increased. The results quoted by Dr. Price were somewhat unexpected, as we now found that it was probably an advantage to have been gassed. The paper showed the value of continuity of records. He supposed that the Ministry of Pensions possessed the most complete health records of a section of the community than had elsewhere been collected. Statistics made from such records were certainly of great value. He pointed out that there was a great increase in the diagnosis of tuberculosis just after the war mainly on account of the possibility of a pension being obtained.

Dr. PEARSON gave some additional details about a case, to which Dr. Price had referred, of œsophageal stricture said to be a sequel to gas poisoning.

Dr. NEVILLE COX (Brighton) asked what proportion of cases with foreign bodies in the lung had received a final award. He thought that it would be of great advantage if these cases could be sent to the tuberculosis officers for purposes of observation.

Dr. JESSEL said that in 1920 he had been asked to work out the connexion between tuberculosis and gas poisoning. In 1281 pulmonary cases he found a small percentage, similar to that stated by Dr. Price, had developed tuberculosis following gas poisoning.

Dr. W. ARNOTT DICKSON (Gloucestershire) said that there now seemed to be three almost sure preventives of tuberculosis—viz., gassing, enlarged tonsils, and delicacy in childhood.

Dr. T. ELLIOTT (Shropshire), after quoting the work of the Henry Phipps' Institute on the question of latent tuberculosis, asked whether or not it was possible that the trauma to the lung opened up a latent lesion instead of causing a fresh onset of the disease.

The CHAIRMAN was interested in the question of laryngitis following gassing, and instanced a case of mustard gas poisoning, followed by aphonia and dyspnœa. A diagnosis of tuberculous laryngitis was made, and the patient was found later to have pulmonary tuberculosis. He gave some figures of patients in Kelling Sanatorium with tuberculosis following gassing and wounds of the chest, and inquired whether it was a fact that the nature of the foreign body played a part in the development of tuberculosis. It was possible that rounded smooth foreign bodies were less harmful than those consisting of roughened angular fragments.

Replies.

Commander FAIRLEY thought that œsophageal stricture was an unlikely sequel to gas poisoning. In experimental work in animals fed on gas-impregnated water no lesion had been found in the œsophagus. A concentration of gas sufficient to cause ulceration of the stomach was quite without effect on the œsophagus. He did not think it was possible to have food impregnated with a concentration of gas sufficient to cause poisoning and in any case it would be extremely unpalatable.

Dr. PRICE said that the men who had received a final award would come to the tuberculosis officer if they became worse. He had found few primary laryngeal complications following gassing, and in any case tuberculous laryngitis was usually associated with advanced pulmonary tuberculosis.

NEW CANCER HOSPITAL FOR MANCHESTER.—It is stated that a new Manchester hospital for the treatment of cancer and for research is to be provided by uniting the Christie (Cancer) Hospital and the Radium Institute on the site of Groombridge House, Withington.

NATIONAL HEALTH INSURANCE.

WORKING OF THE ACTS IN SCOTLAND.

THE tenth annual report of the Scottish Board of Health, which appeared recently,[1] contains a careful study of the working of the National Health Insurance system up to the end of the year 1928, when the Board was superseded by the new Department of Health for Scotland. The summary, which covers a period of ten years, deals with the work of the approved societies, the insurance committees, the Board's inspectors, and the district medical officers, who correspond to the regional medical staff in England and Wales.

APPROVED SOCIETIES.

A reduction in contribution income for 1928 was due to the lowering of the insurable age limit on June 2nd from 70 to 65 years. The state of the several industries is reflected in the sale of insurance stamps, which has dropped in varying degree according to the extent to which their members belonged to the depressed trades. Nevertheless, as in England and Wales, the expenditure on benefits was maintained at a high level. The actual cost of sickness and disablement benefits in Scotland increased from £1,293,000 in 1921 to a peak of £2,021,000 in 1927, falling to £1,756,000 in 1928, when the figure of 1928 would have been still lower had not the disablement benefit kept up, especially in the case of men, the rise in the cost of disablement pointing to an increase either in the number of claimants or in the average duration of the claims. The claims of women are in excess of those of men and there is a movement to separate the two funds for the purposes of valuation.

Elimination of bad claims is the duty of the district medical officers who advise and assist insurance practitioners in counteracting the effect of lax certification, and also help the societies in the selection of cases for reference. As in England and Wales, it has been found that some societies have adopted an arbitrary basis of selection which results in a clogging of the machinery.

The special concession made to genuinely unemployed persons whereby despite their inability to contribute they remain entitled to cash benefits at the minimum rate was continued during the year 1927–28. For this purpose societies received some of the unclaimed money in the stamp sales account and the grants will be more generous in future. In the terms of the amending Act of 1928 such arrears will be entirely excused and will involve no reduction whatever in the cash benefits provided the insured person is able to satisfy his society that he has really been available for employment of an insurable nature, but unable to obtain it. The Ministry of Labour have now arranged to stamp the cards of such persons at the exchanges during each week of unemployment.

Additional Benefits.—The funds allocated to dental benefit were found inadequate to meet the demands, and in many societies the grants had to be reduced from 100 to 75 per cent. of the cost of extractions and conservative treatment, while half the cost of dentures was reimbursed. The amount of money available was further curtailed by the fact that part of the 1928 moneys allocated had been used in the previous year. The amount of money spent on other forms of additional benefit was small. Certain benefits which ceased to operate at the end of the year included medical attendance on dependents and payment of disablement allowance to members not totally incapable of work. Power given by the 1924 Act to expend money on such benefits without approval was repealed in favour of new provisions which enable societies to expend moneys on bona-fide charitable objects, subject to the approval of the Board.

[1] H.M. Stat. Office. Cmd. 3304. 6s.

The increased number of references to the district medical officers indicates the increasing popularity of this service. Just as these officers were allowed to advise the societies with regard to the kind of cases to be referred, so they were employed to interview and advise practitioners on the question of certification. An addition to their numbers was under consideration at the end of the year. Of the 38,834 cases referred to them over 22,800 were examined and of these 8487 (or 37 per cent.) were found capable of work. Compared with the experience in England and Wales this seems a high percentage.

Of the total number of references only 1·3 per cent. came from practitioners themselves—regrettable enough although a development in this practice would no doubt require an increase in staff.

Insurance Committees.

The administrative expenditure of these committees was estimated at £49,000. Nine or ten committees required additional credits to balance their accounts. The index registers of the Scottish Committees were cleared in 1926. All known inflation had been removed from them by Oct. 1st, 1927, but effect had still to be given to notifications then being received intimating loss of title to medical benefit at the end of that year. Medical lists were not reduced until the end of 1927.

Special mileage to the amount of £325 was granted to practitioners whose journeys were rendered more difficult by the closing for reconstruction of certain main roads.

During the year 18 complaints were lodged by insured persons or approved societies against insurance practitioners. Six of these involved alleged breaches of the certification rules, four were charges of alleged neglect, seven complaints involved charges of demanding fees from insured persons, and one was a case of an irregularity in causing an insured person to transfer to the practitioner's list. Fines of £5 and £25 were imposed in two cases for irregularities in certification. In a third case in which a lay assistant had been allowed to give certificates the practitioner's list was reduced to 1200. For charging an insured person a fee and raising an action in court to recover it one practitioner was fined £50. For failing to provide proper surgery accommodation fines of £10, £25, and £50 were imposed by insurance committees; in two of the cases the penalty was reconsidered on appeal. Five practitioners were reported by district medical officers for failure to return to them the reports on insured persons referred for examination, penalties of £20, £10 and one guinea being imposed. Two practitioners were fined for failing to return medical cards to their committees.

Drug Fund.—Expenditure followed much the same lines as in England and Wales; a peak was reached in 1924, when the amount expended averaged 2*s.* 1*d.* per insured person in the country. The amount has come down steadily since then to reach 1*s.* 10½*d.* last year. A central checking bureau in Glasgow keeps a control on prescribing. In the course of the year panel committees in 16 areas recommended a surcharge in the case of 46 practitioners, and a sum of £267 14*s.* was recovered from them and repaid to the drug fund. In three cases the practitioners appealed, but the committee's findings were upheld. A scheme has been instituted for the testing of drugs and appliances, and insurance committees have been asked to furnish a detailed report of their results.

A sum of £46,000 was allocated to the special mileage and necessitous districts fund, of which £3500 was disbursed centrally for the improvement of the medical service in sparsely populated areas. The remainder went in subsidies to practitioners in isolated single-practice areas for maintenance of telephones, outlying surgeries, provision of ambulance service and grants to attend post-graduate courses.

New regulations were made for exempt persons whereby their title to medical benefit was prolonged. This right is of considerable value because so long as an exempt person remains entitled to medical benefit he is deemed to be insured for widows' and orphans' pensions purposes. An arrangement was made during the year with the Ministry of Labour whereby 1196 claims were referred to the Scottish Board of Health for investigation. Under the provisions of the Unemployed Insurance Act, 1927, it is now possible for a person to claim exemption who is employed in a seasonal occupation which does not ordinarily last for more than 18 weeks in any year, and who is during the rest of the year not ordinarily employed in an insurable occupation. This ground for exemption was a boon to seasonal fishworkers.

Various provisions in the 1928 Act necessitated new regulations. For example, shore fishermen required to be compulsorily insured from Jan. 1st, 1929. A special order was made excluding from insurance those shore fishermen engaged in ventures where the catch is not sold, but is divided among them in kind. The order provided that the cost of contributions payable may be deducted from the gross earnings of the vessel before the share-out among the men takes place. The 1928 Act also made provision for the compulsory insurance of persons who contract to perform work of a manual character for the purpose of the trade or business of another person, and special orders were made to provide for such cases.

During the year 61 employers were prosecuted for non-payment of insurance and pensions contributions. Conviction followed in 49 cases.

Insurance Inspectors.

Unemployment due to trade depression did not loom so large in Scotland as in other parts of the kingdom. The increase in the insured unemployed was 1·38 per cent. as compared with 5·27 per cent. for the whole of Great Britain and Northern Ireland. The grave unemployment figures in the heavy industries are not due only to the war; the exhaustion of ironstone in Scotland has led to the necessity of importing raw material and the output of the iron and steel industry has been reduced. This reacted on coal mining, and in Lanarkshire during 1928 78 pits employing 3218 men were permanently shut down.

Emigration is responsible for the depletion in the ranks of skilled workmen. From 1921–26 the net emigration from Scotland was 49,852, from England and Wales 59,770; in 1913 the figures were 8188 for Scotland and 27,050 from England and Wales. The figures are serious because they represent the younger and more vigorous workmen. New industries are being developed such as artificial silk, rubber tyre and paper manufacture, but these gains are small in comparison with the losses.

In Scotland the future is likely to impose a rather severe strain upon the insurance scheme in regard to both contribution income and benefit expenditure. Bad trade increases the difficulties in collecting contributions and encourages evasion of payment on the part of employers. On the other hand, the advent of the contributory pensions scheme has effectively increased the employer's interest in and readiness to pay contributions.

The special difficulties of investigation into claims show no sign of diminishing, nor is it proving easier to determine the applicant's age for pension purposes. One man stated that he was 20 when he "first played fitba' for the Hibs"; another remembered that when he was 9 years old he suffered imprisonment for 14 days for stealing apples. But the pensions scheme in conjunction with the Insurance Act has proved a very real boon; even to men in poor-law institutions it has been welcomed as a means of freedom. The substantial benefits of the joint scheme are to-day firmly fixed in the public mind.

District Medical Officers.

The experiences of these officers are very similar to those of the regional medical officers in England and Wales. The number of references for women was disproportionate to that for men; 47 per cent. of men referred were found incapable and 53 capable of work, whereas in women referred 32 per cent. were found incapable and 68 capable.

An analysis of 5000 consecutive cases (2378 men and 2622 women) referred in Glasgow was made with a view to determining the female factor. Unemployment figures did not affect the numbers. The cases were grouped in age-periods. In the 16–35 group (by far the largest) married women comprised 46·5 and single women 53·5 per cent. Of the married women 73 and of the single women 71 per cent. were found capable of work. The three outstanding diseases given on the certificate were anæmia, pregnancy, and post-puerperal debility; the percentage found capable of work was 82, 40, and 89 respectively. In the 36–45 group 71 per cent. of the married and 55 per cent. of the single women were found capable.

Bronchitis in this period was one of the main causes of incapacity, but it was evident that the certifying practitioner's opinion was based more on symptoms than on physical signs. The same applies to rheumatism. In the 46–50 group 60 per cent. of the married and 50 per cent. of the single women were found capable. Rheumatism and bronchitis formed 46 per cent. of the references. Of the cases certified as rheumatism 72 per cent. were found capable and again it seems that subjective symptoms were given undue weight. Few cases of cardiac disease were referred; they amounted only to 4 per cent. of the whole and were all found incapable. It was evident that, after middle age at least, the married woman is not a good proposition from the health insurance point of view.

Attention is called in the report to the vague certification used by practitioners. Based as it is on symptoms, it follows inevitably that insured patients are fit for work when they declare themselves to be so and the recipients tend to control expenditure. Accurate certification, it is remarked, must be the foundation on which any medical insurance is based.

An interesting series of investigations was made into cases of anæmia and of albuminuria. In the former it was found advisable to use the Haldane method, 80 per cent. being taken as the standard for men and 75 per cent. for women. On this standard incapacity due to anæmia was present in only 13 per cent. The results suggest the futility of trying to ascertain the presence of anæmia without a hæmoglobin examination.

In the cases of albuminuria the efficiency of the kidney was estimated by the urea-concentration test. In the absence of other abnormal signs, those with a concentration above 2 per cent. were regarded as capable of ordinary work. Œdema and high blood pressure were considered to incapacitate even though the concentration was above this level. Below 2 per cent. most of the cases were regarded as incapable. The test enabled the medical officers to certify 30 per cent. of the cases of albuminuria as fit for work.

The problem of industrial rheumatism is touched on in the report and certain conclusions are reached:

1. That it is advisable to give wide publicity to the necessity for prolonged rest treatment in rheumatic fever.

2. That mitral stenosis should be treated in cardiac wards pending the establishment of compensation.

3. That focal infection should be universally looked for and treated.

4. That the presence of focal infection and age-incidence form a convenient classification for the commencement of preventive measures in cases of industrial rheumatism.

5. That convalescent homes should be not only places for rest, recreation, and general tonic treatment, but should administer the more specific tonic treatment of ultra-violet rays, massage, and radiant heat.

MEDICINE AND THE LAW.

The Croydon Inquests: Action by the High Court.

WHILE the time has not yet arrived for summarising the series of inquests in the Croydon arsenic cases, one step—the quashing of an inquest held on Mr. Edmund Creighton Duff in April of last year and the ordering of a fresh inquest—may be described. If the High Court of Justice interferes with a coroner's jurisdiction, it is usually an indication of some default on the coroner's part. Section 6 of the Coroners Act, 1887, for instance, contemplates that the High Court will order an inquest if a coroner refuses or neglects to hold an inquest which ought to be held. The same Section also authorises the High Court to order a fresh inquest if satisfied that such a course is necessary or desirable, because at the original investigation there was fraud, rejection of evidence, irregularity of proceedings, insufficiency of inquiry, or otherwise. The amending Act of 1926 explained Section 6 as meaning that the High Court could also act whenever satisfied that, in the interests of justice, a fresh inquest was necessary or desirable "by reason of the discovery of new facts or evidence." As is made clear in the latest edition of Jervis on Coroners, the effect of the amendment is that an order by the High Court for a fresh inquest can now be invited by the coroner himself, and is not to be deemed as stigmatising him for some default. The Attorney-General, in asking for a new inquest upon Mr. Duff, was careful to place on record the fact that he was not moving against the wishes of the coroner, but at his request. The verdict on June 1st, 1928, was that Mr. Duff died from natural causes. Dr. Elwell, who attended Mr. Duff, had been puzzled about the cause of death, and had brought the facts to the notice of the coroner, suggesting that the symptoms might indicate some form of ptomaine poisoning. On analysis of certain organs, the public analyst failed to ascertain the presence of poison. In the absence of evidence accounting for the death, Dr. Brontë expressed the view at the inquest that death was due to myocarditis, though puzzled by the vomiting and other symptoms. After the verdict of death from natural causes in June of last year the following facts occurred. Miss Vera Sidney, Mr. Duff's sister-in-law, died in February last, and Mrs. Sidney, her mother, in March. Inquests in both cases produced evidence of arsenical poisoning, and in May Mr. Duff's body was exhumed on Home Office order with resultant indications of traces of arsenic. Without entering into these facts, the Lord Chief Justice said sufficient evidence had come to light since the original inquest to justify the order applied for. The Court, therefore, made absolute a rule for a writ of certiorari for removing the former inquest into the High Court; having by this ancient machinery got the inquest into its own hands, the Court quashed it and ordered a new inquest. Mrs. Duff, the widow, wrote a letter to the press, published in the *Times* of July 2nd, expressing the natural feelings of a wife in regard to the body of her husband not only examined post mortem, but also subsequently exhumed for further examination. She wrote in consequence of reading an announcement that "a second exhumation of Mr. E. C. Duff is being considered"; she protested that the second examination should have been absolutely thorough, and that "it should not be possible in a Christian country that the body of a good and decent citizen should be treated in such a cruel and casual way because two or three Home Office experts disagree, presumably about the decimal quantities of the drugs found in him over a year after his death." "Even savages," she added, "respect their dead." Later in the day on which the letter appeared, Scotland Yard issued a brief official statement that there was no ground for the suggestion that any further exhumation of Mr. Duff's remains would be required by the police. The sympathy, which must always be felt for the relatives during inquiries of this nature, will

not be withheld from Mr. Duff's widow. Perhaps the most reassuring feature of the whole story hitherto has been the fact that the action taken by Mr. Duff's medical attendant upon the doubtful symptoms which accompanied the final illness ensured the opportunity for judicial inquiry at the time.

The Prosecution of Col. Kynaston.

The police-court proceedings against Lieut.-Colonel J. W. Kynaston have ended in a victory for him on one point and a defeat (unaccompanied by serious consequences) on another. At the further hearing of the summons against him at Marlborough-street police-court on July 2nd the ground was considerably cleared. The defendant, it will be recalled, is charged with wilfully and falsely pretending to be a doctor of medicine, and wilfully and falsely using the title of "M.R.C.S. Eng." contrary to the Medical Acts. Mr. G. D. Roberts, for the prosecution, explained that he was not saying a word against Col. Kynaston's honour. The prosecution did not impute fraud, and did not ask for a large penalty. The view of the prosecution was that the General Medical Council, as head of the medical profession, was the judge of the standards of professional honour, and had statutory power to strike persons off the Medical Register if certain conduct was found proved. Rightly or wrongly, the General Medical Council, in 1922, found certain conduct by Col. Kynaston proved, and struck him off the Register. The use of the title "doctor," coupled with medical practice, must (said Mr. Roberts) amount to a representation that the defendant was a doctor of medicine. The Royal College of Surgeons had taken away his diploma; consequently Col. Kynaston was not entitled to use the description "M.R.C.S." Col. Kynaston's case, on the other hand, is that his name was illegally removed from the Register for reasons described in THE LANCET lately (June 29th, p. 1376) in connexion with his application for a mandamus. If the law courts will not allow the merits or legality of that removal to be reopened or questioned, then Col. Kynaston maintains that no medical man is obliged to register, that he himself had never claimed to be on the Register, that he has been a doctor for 20 years, and in the common and popular sense of the word he is still a "doctor," no matter though his name has been removed from the Register or though the Royal College of Surgeons has automatically (and, as he maintains, unlawfully) deprived him of his diploma upon such removal. Mr. Cancellor, the magistrate, gave his decision on July 9th. He found—presumably as a question of fact—that the defendant did not wilfully and falsely pretend to be a doctor of medicine; the summons on this point was therefore dismissed. He also found that the defendant did commit a breach of the statute by continuing to use the letters "M.R.C.S."; but he dismissed the summons under the Probation of Offenders Act with a serious caution and warning that persistence in publishing his advertisement would make the defendant liable to serious penalties. The magistrate was for various reasons reluctant to record a conviction against him.

Dr. Bell's Acquittal.

The re-trial of Dr. H. W. Bell, of Oakley-street, Chelsea, on the charge of manslaughter, and of having performed an illegal operation upon Miss Kathleen Kelly, ended on July 2nd, in a verdict of "Not Guilty," on both counts. The previous proceedings, when the jury disagreed, were summarised in THE LANCET of June 15th, p. 1273. In the course of the recent re-hearing before Mr. Justice Swift, at the Central Criminal Court, Sir Henry Curtis Bennett, appearing for the defence, emphasised Dr. Bell's high reputation. Dr. Bell, he said, had merely made an examination of the young woman, which he was perfectly entitled to make, and which was perfectly lawful; he advised that she should go into a nursing home, where she could be properly looked after. Dr. Bell gave evidence after counsel's opening speech for the defence, and the jury returned their verdict of acquittal without leaving the jury box.

IRELAND.

(FROM OUR OWN CORRESPONDENT.)

A PROPOSED MILK BILL.

Dr. E. F. Stephenson, chief medical adviser of the Department of Local Government and Public Health, in a press interview a few days ago, gave information about a milk Bill which the Government intends shortly to introduce. Early last year an inter-departmental committee furnished a report which contained several recommendations for the improvement of the milk-supply of the country. It is on these recommendations that the provisions of the Bill are based. Dr. Stephenson states that the Bill aims at the production of clean milk—not the cleansing of dirty milk—by enforcing strict supervision of the cow, the dairy, and the distribution. To secure these ends a wider interpretation will be given to the words "milk" and "dairy," and the registration of all persons carrying on the trade of dairymen, in addition to the registration of premises, will be made mandatory. It has been shown that clean milk can be produced without any great capital expenditure in altering byres, and that *method*, rather than buildings, determines its hygienic properties. The production of clean milk is not difficult. Dr. Stephenson draws attention to the educative work that has been done by various voluntary organisations, and to the steps that have been taken by his Department to persuade local sanitary authorities to enforce existing laws and regulations. He points out that the Dairies, Cowsheds and Milkshops Order of 1908 is somewhat out of date. The Regulations under the new legislation will not alone deal with the lighting, ventilation, cleansing, drainage, and water-supply of the dairy, but will secure a more thorough supervision, inspection, and examination of dairy cows, the proper grooming of animals, personal cleanliness of milkers and distributors, the cooling of milk, and its conveyance and distribution in sterilised vessels and utensils. Furthermore, the grading of milk and the use of special designations will be authorised, and misleading terms prohibited. The bacteriological examination of milk will be a guarantee to the purchaser of a high quality article, and a protection to the honest vendor against unfair competition. Drastic penalties against selling dirty milk will be enforced. The use of preservatives in milk was prohibited by an Order which came into operation in October last.

Much has already been done, Dr. Stephenson remarks, to prevent the spread of the acute specific fevers through the medium of milk, and the records of the Saorstat compare favourably now with those of other countries as regards milk-borne infection. The Bill now to be introduced enables a medical officer of health to stop the sale of milk if there is epidemiological or other evidence that it is the vehicle of infection. The safeguards relied on in the Bill for the protection of the public against bovine infection are: (1) inspection and examination, (2) tuberculin test, (3) bacteriological examination. The higher grade milk proposed under the Bill must be produced from cows which have passed the tuberculin test and a clinical examination.

He adds that the placing of the Bill amongst the Statutes of the State is a matter of little account in proportion to the spirit with which it is administered. The appointment of a county medical officer of health in every county is essential to attain the objects in view under the present measure. "Success can only be achieved by steady, firm, and uniform administration exercised by a whole-time trained sanitarian. The necessity for these officers is now well recognised, and their appointment is being pressed."

MOUNT VERNON HOSPITAL: STAFF APPOINTMENTS. Mr. Geoffrey Keynes and Mr. Stanford Cade have been appointed surgeons, Lady Barrett and Dr. Malcolm Donaldson gynæcologists to the hospital.

Public Health Services.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

THE following are 1928 statistics of one borough and one urban district :—

Name of district and estimated (R.-G.) population.	Birth-rate.	Death-rates per 1000 of the population.					Death-rates per 1000 births.		
		All causes.	Tuberculosis.	Cancer.	Respiratory diseases with influenza.	Heart disease.	Infant and neonatal mortality.	Young child (1–5 yr.) mortality.	Maternal mortality from childbirth.
Ilford .. .. (113,500)	15·8	8·4	0·63	1·26	1·1	1·7	45/24	22	4·0
Edmonton U.D. (73,027)	18·2	9·9	0·87	1·21	1·7	1·4	69/–	37	3·0

Ilford.

Dr. A. H. G. Burton says that the year 1928 was characterised by a heavy incidence of infectious diseases. The attack rate for scarlet fever and diphtheria was the highest for the past five years. There was a small outbreak of paratyphoid fever and small-pox occurred on one occasion. There were 25 cases of paratyphoid, 10 of which occurred in April. The cases continued cropping up at intervals until November. All possible sources of food infection were investigated with no result, and Dr. Burton had no reason to trace the cases to infected cream, which was considered to be the cause of the London epidemic. None of the cases proved fatal. There was one case of small-pox in an unvaccinated girl of 14 and another Ilford resident developed small-pox outside the borough. Both cases were of the mild type and in neither case was the origin discovered. The much-needed cubicle wards at the isolation hospital have been completed. One is a new block consisting of four wards on each side of the duty room with glass partitions and an operating theatre at one end. Another block of obsolete pattern has been converted so as to provide eight cubicles.

The open-air school has been completed and Dr. Burton points out that in the majority of cases new schools cannot be built on open-air lines and that a further advantage of the open-air school is that delicate children unfitted for ordinary school life can be educated together and receive special care, observation, and treatment. Two needs of the school medical service are an increase of the dental staff and the provision of a complete orthopædic scheme. An immunisation scheme against diphtheria has been under consideration and the Ministry have pointed out that such a scheme would not be eligible for a grant under the maternity and child welfare regulations. Scarlet fever has been, on the whole, of a more severe type and has shown a tendency to involve the mastoid bone. Nine per cent. of the cases of scarlet fever developed middle-ear disease and six cases of mastoiditis occurred. In the previous year 5 per cent. of the scarlet fever cases developed middle-ear disease and there was no case of mastoiditis. Antenatal work makes progress. The number of first attendances at the clinics was 198 in 1921 and has gradually increased to 653 in 1928. The number of women admitted to the maternity home has increased from 139 in 1919 to 481 in 1928, and all the patients admitted, who are to be attended by a midwife, are examined at the antenatal clinic.

During 1928 all the new houses built, numbering 877, were private enterprise subsidy houses and the only two notices served for overcrowding were complied with.

Edmonton.

Dr. H. W. Harding says that the housing problem in this urban district is not solved in spite of the efforts of the council. On the one hand are folk living under sordid conditions and quite contented. On the other there are families living under conditions of overcrowding which must sap the vitality of the strongest. Rents are high and so-called furnished rooms are let at an exorbitant figure. The interior of overcrowded houses rapidly becomes dilapidated and the sanitary inspectors have difficulty in deciding as to which defects the owner of the house should be held responsible for. Of the 676 new houses 186 were subsidy houses erected by the local authority and 24 were subsidy houses erected by private enterprise. An unusual occurrence was a plague of flying beetles, which began in one part of the district early in May. The beetles (*Harpalus ruficorius*) swarmed in myriads against the backs of neighbouring houses from fields in which a good crop of potatoes was raised. The trouble lasted about two months and various disinfectants were tried without apparent benefit. On the advice of the Ministry, the farmer planted his land with wheat, which would stand heavy rolling, the idea being to crush any beetles which remained in the ground. Up to April, 1929, there had been no signs of recurrence. It has been suggested that these beetles, which are carnivorous in habit, had made a wholesale migration owing to the exhaustion of their natural food.

The day nursery, which is at present run privately, has been offered to the council and Dr. Harding suggests that a new child welfare centre might be erected on the site, as the present centre is inadequate. Early in 1927 an arrangement was made with the guardians for the treatment of cases of rickets, marasmus, &c., at the North Middlesex Hospital by ultra-violet rays at a charge of 1*s.* per exposure. Dr. Harding complains that out of 128 patients sent to the hospital for this special treatment during 1928, 78 discontinued treatment contrary to medical advice.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED JUNE 29TH, 1929.

Notifications.—The following cases of infectious diseases were notified during the week :—Small-pox, 160 (last week, 166) ; scarlet fever, 1830 ; diphtheria, 965 ; enteric fever, 56 ; pneumonia, 850 ; puerperal fever, 37 ; puerperal pyrexia, 85 ; cerebro-spinal fever, 12 ; acute poliomyelitis, 2 ; encephalitis lethargica, 30 ; dysentery, 5 ; ophthalmia neonatorum, 128. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the Metropolitan Asylums Board on July 2nd–3rd was as follows :—Small-pox, 196 under treatment, 8 under observation (last week 239 and 3 respectively) ; scarlet fever, 1314 ; diphtheria, 1635 ; enteric fever, 10 ; measles, 211 ; whooping-cough, 470 ; puerperal fever, 28 (plus 6 babies) ; encephalitis lethargica, 124 ; "other diseases," 35. At St. Margaret's Hospital there were 19 babies with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns, including London, there was no death from small-pox, 2 (1) from enteric fever, 34 (7) from measles, 4 (1) from scarlet fever, 35 (13) from whooping-cough, 21 (3) from diphtheria, 39 (7) from diarrhœa and enteritis under two years, and 27 (2) from influenza. The figures in parentheses are those for London itself.

Liverpool reported 9 deaths from measles ; no other great town more than 2. Five deaths from whooping-cough were reported from Leeds and 3 from Birmingham. The highest figures for diarrhœa were 4 deaths each from Liverpool and Manchester, 3 from Birmingham. Four deaths from small-pox are now reported for the month of May from areas outside the great towns. These have been assigned as follows :—2 to Gravesend (Kent), 1 each to Bentley-with-Arksey (Yorks W.R.), and Leigh (Lancs).

The number of stillbirths reported during the week was 294 (corresponding to a rate of 42 per 1000 total births), including 54 in London.

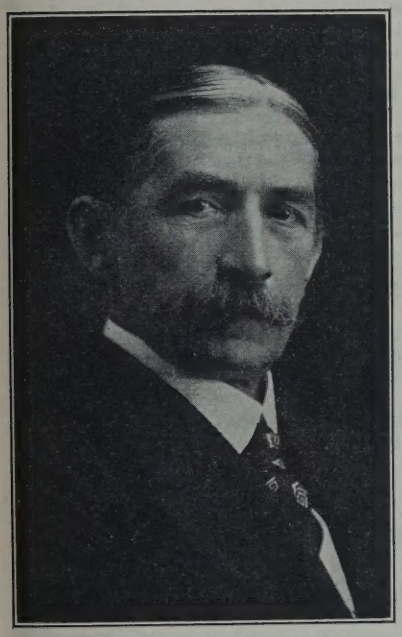
Obituary.

JOHN MITCHELL BRUCE, C.V.O., M.D. LOND., F.R.C.P. LOND., LL.D. ABERD.,

CONSULTING PHYSICIAN, CHARING CROSS AND BROMPTON HOSPITALS.

WE regret to announce the death of Dr. Mitchell Bruce, which occurred at his house in Harley-street on Sunday, July 7th, in the eighty-fourth year of his age.

John Mitchell Bruce was born at Keig, Inverurie, and was educated primarily at the local grammar school, whence he proceeded to the University of Aberdeen, where he graduated M.A. in his twenty-first year. Having decided to study medicine he joined the Middlesex Hospital in 1866 with the intention of graduating in medicine at the University of London. He was a highly successful student both at the hospital and in the examinations for the medical degree of the University, gaining honours, gold medals, and scholarships in several subjects. He graduated in 1870 and proceeded two years later to the M.D. degree, in which year he also obtained the M.R.C.P. Lond. He had in the meantime attended post-graduate classes in special pathology at various centres abroad, especially at Vienna, and on return to England he continued these studies under Burdon-Sanderson and Klein. So that when in 1871 he was appointed lecturer on physiology and pathology at the Charing Cross Hospital medical school, after a brief period as resident at the Aberdeen Royal Infirmary, he was unusually well-equipped for his duties. With Charing Cross Hospital he was connected for over fifty years, for in 1872 he was elected assistant physician; ten years later he became full physician and served with notable success as dean of the medical school; he held his active post until 1904, when he was elected consulting physician. He was for a time physician to the East London Children's Hospital, and for a longer period to the Brompton Hospital for Consumption and Diseases of the Chest, and in the general and the special hospitals he made a distinguished mark as clinician and teacher. His classes at Charing Cross Hospital were held to turn out some of the best trained students in the metropolis, while his demonstrations to the residents at Brompton and to occasional post-graduate workers, especially in the out-patient department, were remarkable for their clearness and practical value.



DR. MITCHELL BRUCE.

In particular reference to his educational work at Charing Cross Hospital one closely associated with the institution writes: "At the close of the last century the medical teaching at Charing Cross Hospital reached a very high level, and was considered equal to the very best in London. This was due to the energy and ability of T. H. Green and John Mitchell Bruce, whose lectures and clinics were attended by a crowd of students from other hospitals. Their teaching was very dissimilar: Green seized on fundamental points and impressed them on the students' minds by constant reiteration; Bruce attracted the student by illustrating his point with vivid descriptions of patients in the hospital. In other respects their methods were different. Green's chief weapon was sarcasm, and after ten minutes' examination many a student has vowed never to enter his ward again, but came again, finding the discipline salutary. Bruce's weapon, on the other hand, was kindness. He seized on the student's trifling knowledge, gave him praise, excused his mistakes, encouraged him to fresh efforts. And this came from Bruce's kindness of heart, which was always evident. To be a student at Charing Cross Hospital was to have Bruce as a friend for life, for his kindness was always manifest. Further he spent infinite pains to give comfort to his patients, while he refused ever to be hurried in the discharge of his duties and would never undertake a consultation unless he was absolutely sure of having time to do his duty by his patient. His name will always be cherished at Charing Cross with deep affection as a wise administrator, a great teacher, and a good friend."

During a large period of his time of office at Charing Cross he lectured upon materia medica and therapeutics and as a result he wrote his well-known work on the subject of which the ten editions have been appearing steadily since 1884, it being stated that 70,000 copies have been sold. Something the same large and merited popularity was achieved by Mitchell Bruce's well-known book on treatment, "The Principles of Treatment and their Applications in Practical Medicine." A treatise of this kind was exactly wanted at the date when it was issued—viz., 1900—for much of the therapeutical teaching in the medical literature of the time was purely symptomatic or empirical, while bedside instruction on treatment was, with notable exceptions, brief, at any rate by comparison with the dissertations on morbid appearances. Mitchell Bruce assumed no therapeutical laws, but tried to find them in the facts of ætiology, pathological anatomy, and clinical characters. These he examined in order to obtain lines of treatment, and the sound logic of the method was immediately recognised by readers whose large number was steadily maintained for subsequent editions.

Dr. Mitchell Bruce had a long and honourable connexion with the Royal College of Physicians of London. He was elected a Fellow in 1878, served on the Council, and became Senior Censor in 1911. This year he delivered the Lumleian Lectures of the College, taking as his subject cardiovascular degeneration. In 1913 he was Harveian orator when in an able dissertation he traced the influence of Harvey's work in the development of our knowledge respecting infection and immunity. The Lectures and the Oration were published in THE LANCET at the date of their delivery. Mitchell Bruce was a past President of the Medical Society of London, and later of the Section of Medicine of the Royal Society of Medicine. He was also at different times editor of the *Practitioner* and co-editor of Quain's "Dictionary of Medicine," where he wrote the sections upon certain forms of heart disease and upon acute and chronic rheumatism. As an editor he brought a clear and well-informed mind to bear upon all his work. It was natural that he should be in request as an examiner, and the universities of Cambridge, London, and Manchester, and the English Conjoint Board all availed themselves of his services in this capacity. Hence at the summit of his career he was an exceedingly busy man, for alongside of his hospital, educational, and literary work he conducted for many years a large consulting practice. The University of Aberdeen made him LL.D., the Royal College of Physicians of Ireland gave him their

honorary Fellowship, and in 1919 he was created C.V.O.

Our portrait, by Messrs. Elliot and Fry, depicts him at the age of 60 and at a time when he was an accepted leader of British medicine as a general consultant.

Correspondence.

"Audi alteram partem."

THROMBO-ANGIITIS OBLITERANS.

To the Editor of THE LANCET.

SIR,—In your account of the discussion on Diseases of the Jewish Race at the London Jewish Hospital Medical Society on June 13th (THE LANCET, July 6th, pp. 51, 52), I am reported as saying that in my opinion thrombo-angiitis obliterans was a disease with an economic basis rather than a racial one. May I be allowed to correct this misunderstanding and at the same time to make some remarks on the subject. I certainly did say that some of the Jewish patients had had hardships to pass through in their early life —imperfect nourishment perhaps, qualitatively or quantitatively, in some cases—and that the affected individuals were nearly all of the poorer classes, as were also the subjects of the disease in China and Japan. What, however, I chiefly urged was that there was a constitutional basis of some kind which favoured the development of the disease and which seemed not to be specially connected with the endocrine glands, though it was remarkable, I pointed out, how little evidence there was of any familial incidence.

I would here suggest that the constitutional congenital-developmental factor in question may be of the nature of a primary defect in the walls of the blood-vessels of the limbs, sometimes manifested by definite hypoplasia. Indeed, in cases of intermittent claudication in one or both legs, whether in Hebrew or other individuals of early middle age, a question sometimes arises as to whether the symptoms may not be the result of arterial hypoplasia without any actual thrombo-angiitis obliterans.

The lower limbs may be chiefly affected because, as a rule, they are subjected to more muscular strain than the upper ones; if nicotine is an exciting cause, it should be remembered that more nicotine must pass through the blood-vessels of the parts that are most functionally exercised. The immunity of females may be partly explained by the abuse of nicotine having been as yet very rare amongst Hebrew women of the poorer classes and possibly by there having been less muscular exercise involving the lower limbs. But there may also be some other unknown factor to account for the sex-immunity, which appears to be almost as remarkable as in hæmophilia.—I am, Sir, yours faithfully,

London, W., July 7th, 1929. F. PARKES WEBER.

LOSS OF APPETITE IN CHILDHOOD.

To the Editor of THE LANCET.

SIR,—I was delighted with your annotation (p. 32) under the above heading, and I hope that Dr. Joseph Garland's article may be reprinted in this country in extenso, for it is not easy to get hold of the New England Journal of Medicine. Everything you quote needs saying, and saying vigorously, to every parent troubled with fickleness of their children's appetites, I want to add one thing to the statement, "Where such difficulties arise . . " [viz., a child's resenting change of diet, from breast to bottle, from bottle to cup, from liquid to solid, from known to unknown] "it is absolutely essential to ensure firmness in management on the part of mother and nurse, even if this entails two or three days' misery for all concerned." My addition is that the "two or three days' misery" may result in a lifelong dislike of a food and that, necessary as it may be at the time of weaning, it may be avoided later by a little guile and common sense.

Every "modern" baby is brought up to take cod-liver oil and tomato or orange juice, and from nine months sieved greens. The flavours of these can be used to get babies to take pretty well what you will thereafter. Even a bread-and-butter pudding may be "got down," *horribile dictu*, with the help of cod-liver oil. Gradually the flavouring can be cut down, and the child will eat the new food with avidity. A new food and not a new dislike will have been added to the child's repertoire without the two or three days' misery.

I fear that this note may be considered more fitting for a mothercraft journal than the pages of THE LANCET, for the point may appear trivial. But I make it because I have seen little in my study of diet and dietetics which leads me to believe that dietitians realise that our tastes in food may all be acquired tastes and have to be learnt (and taught). Pavlov has shown that even so typical a carnivore as the dog has to be taught to eat meat. Stefánsson had to teach his Eskimo dogs to eat game. Is it too great a jump to assume (when the assumption is backed by observation) that human beings have to learn to eat every new food put before them? "Education" consists in superimposing first of all a conditioned reflex upon an unconditioned reflex, and then conditioned reflex after conditioned reflex upon that. With foods the final stage of education is that a new food should awaken gustatory reflexes and not anorexia.

The practical outcome is: lay your basis of acquired tastes early and anorexia of "unknown origin" is unlikely to trouble you. The theoretical outcome is, alas, a scepticism extending to the whole of modern dietetics.—I am, Sir, yours faithfully,

Potters Bar, July 7th, 1929. V. H. MOTTRAM.

SHEWRY *v.* MAYBURY: A JUROR'S REFLECTIONS.

To the Editor of THE LANCET.

SIR,—I have been sent a marked copy of THE LANCET commenting on the singular trial and verdict which will be known to posterity as Shewry *v.* Maybury. Now that the trial is all over, I should like to call your attention to a letter, which I copy from the *Times* of June 25th, and which, as a juror, I should like to endorse. I imagine it has the assent of most of the other jurors. The letter, which can only be a reference to the case, though it does not allude to it by name, is as follows:—

Technical Evidence.

"As one of the special jurors who have sat during seven days listening to the evidence of a recent trial so fully reported in your columns, may I make a suggestion of public import? Of the handling of the case and the result naturally I say nothing. But if medical cases are brought before juries, is it right that a Judge and a special jury should listen day after day to the evidence of experts and hyper-experts, when much or most of it contradicts the rest? Counsel were labouring among technical terms which they did not always understand or know how to pronounce. Would it not be right one day to elect medical referees, to whom cases of disputed fees or alleged negligence could be brought to be settled in a friendly way if possible or, if brought into court, reduced first to nutshell form by impartial medical referees?

"I am, &c.,

"SPECIAL JUROR."

Well, these are my sentiments, and further I can say in regard to your interesting article that I was one of the majority in the jury, who were unwilling that after eight years a case should be brought up against Dr. Maybury. Moreover, in spite of my sympathy for the mother in this case, I now suffer from a distinct feeling that Dr. Maybury did not get justice *on the evidence*. It is an uncomfortable feeling, and I am glad to get it off my conscience. Of the reasons why the jury disagreed I cannot say any-

thing, but when you say the case came before "twelve laymen," you are not quite correct. Twelve laymen, none of whom had ever had anything to do with medicine, might have taken a unanimous view on the evidence. However, I cannot enlighten you further in your query as to "what considerations influence a jury's individual or collective wisdom." The mixed verdict in answer to the judge's questions was a compromise between strong disagreements and must remain hugely unsatisfactory to all concerned. One hint to future medical witnesses may be given. The medical witnesses on one side remained in court and showed sincere interest in the case. Those on the other appeared, spoke and disappeared like a drilled phalanx. This, though easy to explain, was noticed by the jury. However, since so much good time was wasted and something of a cloud remains over the medical profession, while Dr. Maybury, perhaps, was being made to suffer for mistakes of his profession as a whole (it must be remembered that individuals are liable to entertain strong prejudices against doctors as such), I wish, as a friend of the profession, as well as a critic, to endorse the letter, which this case evoked in the *Times*, and to hope that out of all this piteous muddle some good may come to the good service of all sufferers, including jurymen. I write without prejudice, and wish to apologise for anything that I should not have written above.

I am, Sir, yours faithfully,

A JUROR IN THE LORD CHIEF JUSTICE OF ENGLAND'S COURT.

July 4th, 1929.

Medical News.

UNIVERSITY OF OXFORD.—At recent examinations the following candidates were successful :—

Medicine, Surgery, and Obstetrics.—H. H. Aitchison, George Campbell, B. R. Caygill, J. A. Eyres, C. R. Greene, H. E. Mansell, J. C. Nicholson, M. G. Pearson, J. W. de W. G. Thornton, and W. J. Walter.

Pathology.—Franklin Bicknell, J. B. Bishop, J. R. Braybrooks W. D. T. Brunyate, F. E. Buckland, E. C. Coaker, C. M. Duncan, D. G. Ferriman, J. H. Hunt, W. E. S. Merrett, C. N. Milner, R. D. Newton, W. R. Pullinger, E. H. Rink, J. A. Scott, Geoffrey Secker-Walker, O. J. Vaughan-Jackson, Elizabeth C. M. Brunyate, and Winifred Mercer.

Forensic Medicine and Public Health.—H. S. Atkinson, J. M. Gibson, T. N. Gledhill, H. M. Harris, R. S. Harrison, J. M. Lees, A. J. M. Melly, C. N. Milner, Geoffrey Secker-Walker, W. B. Williams, and Annie D. M. Adams.

Materia Medica.—J. B. Bishop, J. R. Braybrooks, F. E. Buckland, H. W. Davies, D. G. Ferriman, G. S. Grist, H. C. Harley, M. A. Hatt, G. W. Hinchliff, H. de B. Kempthorne, R. M. Marshall, N. C. Parfit, N. L. Rusby, J. A. Scott, R. F. Woolmer, and C. H. Yeoh.

UNIVERSITY OF LONDON.—At congregations on June 10th and 18th the following degrees, amongst others, were conferred :—

Ph.D.—In Psychology: W. J. Pienaar, William Line, Elsie H. Walters, and J. W. Caughey. In Physiology: M. W. Goldblatt. In Anthropology: P. L. Collignon.

D.Sc.—In Statistics: Ethel M. Newbold. In Biochemistry: H. J. Channon. In Anthropology: W. J. Perry.

At a meeting of the Senate on July 3rd, Sir Gregory Foster was elected Vice-Chancellor for the year 1929–30, and the Rev. John Scott-Lidgett Deputy Vice-Chancellor for the same period. Dr. Graham Little, M.P., was elected as a representative of the Senate upon the Court, and was re-elected for the seventh time as Chairman of the Council for External Students.

UNIVERSITY OF ABERDEEN.—At a graduation ceremony on July 3rd the following degrees and diplomas were conferred :—

M.D.—*A. W. Downie, †J. W. Foster, †A. H. H. Fraser, †George Stuart (in absentia), ‡Dorothy Younie (née, Mitchell), H. W. Corner, C. L. C. Crowe, A. M. Duthie, A. M. Fraser, C. G. S. Milne, and E. N. D. Repper.

M.B., Ch.B.—First Class Honours: §G. A. G. Mitchell. Second Class Honours: ||A. G. Emslie. Ordinary Degree: W. H. Arthur, J. C. Bell, J. G. Black, A. G. Booth, Richard Brown, J. MacA. Croll, James Dunbar, Norah M. E. Dunbar, T. A. Fraser, Margaret F. Gardiner, J. G. Grant, A. C. Harrison, ||Peter Henderson, Robert Henderson, Elizabeth M. Laing, D. L. D. Lamont, A. M. Lawrence-Smith, R. D. MacRae, Isobel M. McRobert, K. R. T. Matthew, J. A. Smith, Sydney Eleanor Smith, William Stewart, D. J. Strachan, and James Thomson.

D.P.H.—David Duncan, J. W. Lobban, R. G. Spink, and George Stuart.

* Highest Honours for Thesis. † Honours for Thesis.
‡ Commendation for Thesis.
§ Completed Final Examination with much Distinction.
|| Completed Final Examination with Distinction.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—On July 4th four Fellows were elected into the Council to fill the vacancies caused by the resignation of Sir James Berry and the retirement in rotation of Sir Holburt Waring, Mr. C. H. Fagge, and Mr. W. Sampson Handley. The result of the poll was as follows :—

	Votes.	Plumpers.
William Sampson Handley (Middlesex)	627	10
Charles Herbert Fagge (Guy's) ..	587	14
Sir Holburt Jacob Waring (St. Bartholomew's)	560	30
Graham Scales Simpson (Sheffield) ..	527	48
Charles Coley Choyce	489	12
Thomas Percy Legg	384	14
Robert Milne	364	41

In all 1091 Fellows voted, including 160 Fellows resident out of Great Britain and Ireland; in addition, five votes were found to be invalid. Mr. Simpson becomes substitute Member of Council for Sir James Berry until 1931; and Mr. Handley, Mr. Fagge, and Sir Holburt Waring are elected for the full period of eight years.

UNIVERSITY OF DUBLIN: *School of Physic, Trinity College.*—At recent examinations the following candidates were successful :—

FINAL EXAMINATION FOR M.B., B.CH., B.A.O.

Part I., Therapeutics, Jurisprudence, Pathology, &c.—*Elizabeth K. Roberts, *A. H. Thompson, D. B. Bradshaw, I. G. L. Ford, T. A. Bouchier-Hayes, F. P. FitzGerald, D. J. O'Ryan, A. J. O'Connor, H. H. G. Dorman, Joseph Miller, P. H. Peacock, and (in completion) H. W. Dalton and G. F. West.

Part II., Medicine.—G. R. Beare, J. N. U. Russell, H. T. Fleming, R. T. O'Shea, A. H. O'Malley, L. L. Griffiths, R. St. J. Lyburn, C. M. Taylor, Frances E. Wilson, Patrick O'Shea, R. I. Reid, G. K. Graham, Anna M. E. M'Cabe, J. F. K. MacCarthy-Morrogh, and E. J. M. Bam.

Surgery.—W. R. Fearon, *C. M. Taylor, H. T. Fleming, A. F. Kennedy, E. B. A. Solomons, R. St. J. Lyburn, L. B. Harris, T. B. M'Mahon, L. L. Griffiths, N. H. Lindsay, John Willoughby, Robert Kahn, Lilla M. Spiller, A. J. Garde, J. T. M'Ginn, R. I. Reid, M. H. Fridjhon, R. M. Wilson, and E. F. S. Morrison.

Midwifery.—*Samuel Levy, A. J. Garde, F. O. Pilkington, William Caldwell, E. S. Tweedy, Aaron Rakoff, J. E. R. Keyms, and F. M. Lyons.

DIPLOMA IN PUBLIC HEALTH.

Part I.—H. E. S. Richards, D. H. F. Milmo, Amedeo Fava, W. J. Kerrigan, and G. M. Tyrrell.

Part II.—*R. A. Q. O'Meara and Amedeo Fava.

DIPLOMA IN GYNÆCOLOGY AND OBSTETRICS.

A. El S. A. Ammar, A. W. Michie, and Fakherddin El Ahmadi.

* Passed on High Marks.

UNIVERSITY OF MANCHESTER.—At recent examinations the following candidates were successful :—

FINAL EXAMINATION FOR M.B. AND CH.B.

*Donal Sheehan, H. S. Bagshaw, F. H. Bentley, Leslie Bold, Bessie H. E. Cadness, T. H. Chadwick, M. A. Chamberlain, D. L. Cran, W. W. Fox, J. M. Greenwood, R. W. Luxton, A. S. McGowan, Mary I. C. Mackintosh, A. B. Moffatt, W. H. Newton, J. H. Pattyson, G. E. Plowright, Marian M. Reekie, C. F. Stott, Alan Taylor, and L. C. Wright.

Forensic Medicine.—E. J. B. Sewell.

* Second Class Honours.

FINAL EXAMINATION FOR M.B. AND CH.B. (NEW REGULATIONS).

Part I., Forensic Medicine, Hygiene, &c.—Roland Barnes, Allan Bigham, A. N. Birkett, A. P. L. Blakely, Barbara E. Bleasdale, Edith M. Casasola, S. T. Cowan, Frank Cort, Winifred Dean, Jonathan Dobson, C. G. Eastwood, J. R. P. Edkins, E. G. Elwell, Margaret M. Ferguson, Dorothy A. Geiler, Neville Harburn, E. W. Hardman, Leslie Jones, W. W. Kay, A. L. Kenyon, C. D. Leflaive, J. C. Nicholson, David Ockman, G. J. Phillips, D. A. Richards, Edward Riley, Bernard Sandler, M. W. Smith, H. W. Thompson, Carl Verity, N. S. Walls, and G. H. C. Walmsley.

DIPLOMA IN BACTERIOLOGY.

M. M. Barritt, Rupert Lyth, R. W. H. Miller, Lois Stent, Mary M. Stewart, Emmeline Wade, and P. M. Wagle.

DIPLOMA IN PUBLIC HEALTH.

Part I.—J. R. Beal, Charles Campbell, A. H. Heyworth, David Kemp, Andrew Meiklejohn, J. S. Sewell, and Ronald Walshaw.

UNIVERSITY OF LIVERPOOL.—At recent examinations the following candidates were successful:—

M.D.

Helen M. Duvall, W. H. Evans, W. M. Frazer, L. S. Goldman, J. C. McFarland, and F. Murgatroyd.

M.B. AND CH.B. WITH HONOURS.

New Regulations.—Class I.: L. Findlay, T. N. A. Jeffcoate, J. Libman, H. J. Partington. Class II.: D. A. Jones, and J. A. Martinez.

Old Regulations.—Class I.: R. K. Bowes. Class II.: W. W. Gerrard, and J. M. Leggate.

FINAL EXAMINATION FOR M.B. AND CH.B.

Part B. (*New Regulations*)—A. H. Barzilay, M. J. Bennett-Jones, A. T. Halton, J. C. Hill, G. A. C. Lynch, C. L. Pratt, C. K. Sconce, E. B. Whittingham, and J. P. Woodward.

Part III. (*Old Regulations*).—S. Alstead, R. J. Doyle, R. A. Furniss, J. N. Parrington, Muriel S. Roberts, N. W. Roberts, J. L. A. Webster, and J. Williamson.

Part A (*N.R.*)—L. G. Anderson, Marjorie E. Birch, A. Blumfield, C. G. Burgess, G. W. Causey, W. N. Chalmers, J. W. Cheetham, D. H. Collins, A. Curtis, P. P. Fox, D. O. Hughes, V. S. Hughes-Davies, A. T. Jones, R. P. Kemp, F. R. Kitchin, E. W. Malcomson, J. L. Mewton, W. J. Poole, M. Solomon, Honora J. Twomey, T. P. Twomey, and R. Wright.

Part I. (*O.R.*)—E. H. Williams.

Part II. (*O.R.*)—R. G. Walker and E. H. Williams.

DIPLOMA IN PUBLIC HEALTH.

Part I.—R. L. Corlett, R. W. Eldridge, A. B. Follows, Susan H. Gilchrist, and E. Hulme.

Part II.—Kathleen Edgecombe, R. R. Evans, Bridget M. O. Gordon, F. C. S. Hinsbeeck, J. S. Logan, and F. L. Smith.

DIPLOMA IN TROPICAL HYGIENE.

G. D. Drury, N. D. Fraser, J. A. L. Innes, and C. Ramdeholl.

The Ethel Boyce Fellowship in Gynæcology of the University of Liverpool has been awarded to Dr. Gwyneth Griffith; the John W. Garrett International Fellowship in Bacteriology to Dr. Muriel Barton Hall; the Robert Gee Fellowship in Human Anatomy to Dr. R. Doyle; the Holt Fellowship in Physiology to Dr. J. H. Follows; the Johnstone Colonial Fellowship in Biochemistry to Dr. R. W. Brookfield; the Lady Jones Research Fellowship in Orthopædic Surgery to Dr. B. L. McFarland; the John Rankin Fellowship in Anatomy to Dr. J. M. Leggate; and the Thelwall Thomas Fellowship in Surgical Pathology to Dr. E. W. Jones. The Samuels Memorial Scholarships have been awarded as follows: Medicine, Dr. S. P. Meadows; Surgery, Dr. J. C. Ross; Obstetrics and Gynæcology, Dr. M. M. Datnow. The University Graduate Scholar in Medicine is Honora J. Twomey.

THE Parliamentary Secretary to the Ministry of Health, Miss Susan Lawrence, M.P., has appointed Miss Ellen Wilkinson, M.P., to be her Parliamentary Private Secretary.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.—The forty-seventh annual dinner of this society was held at the Trocadero Restaurant, London, on July 4th, Dr. Harold Sanguinetti, the President, being in the chair. The toast of "The Society" was proposed in a racy and amusing speech by Mr. Ivor Back, who indicated two kinds of useful meetings for such a society as the West London. One would be a discussion of a common topic about which everyone knew something; the other a discourse from someone who knew everything about an uncommon topic. In his reply, Dr. Sanguinetti related the story of the Society, one of whose aims when founded in 1882, was to promote friendly intercourse and good fellowship among medical men in the area. It was its practice to choose a president in rotation from among surgeons, physicians, and general practitioners, and this year he was occupying the chair as a general practitioner. Their membership, which had reached 650 or more before the war, was still not far short of that number. Even during the war the meetings had been well attended, for their members had been deeply stirred by the marvellous successes of medicine and surgery on the field, and by the problems of maintaining the health of the civilian population at home. Women had since 1924 been admitted into membership. Dr. Julius Burnford proposed "The Guests" in a discourse which traced the origin of hospitality from the time of the cave-man onwards. Sir Nigel Playfair, in reply, admitted that he was the son and grandson of medical men, adding, "I am not quite so lay as I look," and giving a telling example of inherited medical talent. Dr. F. G. Crookshank, speaking as a secretary of 25 years ago, recalled the days when there were giants in the land, and warmly espoused the policy of stimulating the interest of general practitioners in clinical discussions. Dr. F. J. McCann proposed "Kindred Medical Societies," to which Dr. Walter Carr and Dr. Ernest Young replied. "The Chairman" was proposed by Dr. Arthur Saunders, who told how the life of a general practitioner might be combined with a real love of education and a flair for literary effort. During the evening Mr. Herbert Collings entertained the company most entertainingly.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.—It is hoped that a course in gastro-enterology will be held from July 22nd to 26th at the Prince of Wales's Hospital, Tottenham, in conjunction with the North Middlesex Hospital. Those interested are asked to communicate with the Fellowship. From July 29th to August 24th there will be a course in urology at the All Saints' Hospital, Vauxhall Bridge-road, occupying afternoons and evenings. A course in diseases of children will be held at the Queen's Hospital for Children, Bethnal Green, from August 12th to 24th, and an all-day intensive course in medicine and surgery at the Queen Mary's Hospital, Stratford, from August 26th to Sept. 7th. A general course of attendance at the clinical practice of some 40 London hospitals continues throughout the year and may be begun at any time. Details of clinics are provided and the post-graduate is left free to arrange his time-table. Copies of syllabuses and further information may be had from the Secretary of the Fellowship, 1, Wimpole-street, London, W.1.

LONDON HOSPITAL MEDICAL COLLEGE: *Prize-giving.*—Lieut.-Colonel W. M. Pryor, chairman of the College Board, presided on June 28th at the presentation of prizes and certificates to students of the college and dental school by Lord Dawson of Penn, Extra Physician to the hospital. Prof. William Wright, the Dean, said he thought the past year would long be famous in the annals of the hospital and college for the very large number of honours which had fallen to them. In appreciation of services rendered during the King's illness, Lord Dawson had been made a member of the Privy Council, Sir Hugh Rigby had been created a baronet, Dr. Robert Stanton Woods had been knighted, whilst Nurse Black and Nurse Davies had been admitted to Membership of the Order of the British Empire and had been awarded the Royal Red Cross. Among other honours received by active members of the hospital, a knighthood had been conferred on Sir William Paulin, the treasurer, and the Matron, Miss Beatrice Monk, had been created C.B.E. Of former members of the staff of the college, Dr. Chalmers Mitchell, F.R.S., had been knighted; Dr. T. W. Twort had been elected a Fellow of the Royal Society; Prof. J. J. R. Macleod, F.R.S., had been appointed Regius Professor of Physiology at Aberdeen; and Prof. F. Wood-Jones had been invited to occupy the chair of anatomy in the University of Melbourne; whilst Dr. A. W. Woo, a former student, had been elected President of the Chinese Medical Association. Three members of the hospital staff had lately been admitted as Fellows of the Royal College of Physicians, whose Croonian and Goulstonian Lectureships had been offered to two of them, Prof. H. M. Turnbull and Dr. Donald Hunter. Dr. Hunter and Dr. Lewis had been elected to Rockefeller Travelling Fellowships and Dr. L. J. Witts had been appointed Assistant Physician to Guy's Hospital. Of the three distinctions open to undergraduate students of the University of London—namely, the Dunn Exhibition in Anatomy, the Dunn Exhibition in Physiology, and the gold medal for the highest marks in the final examination, the first and last had been gained by London Hospital students—Mr. W. Mushin and Mr. E. A. Hunter. In the first professional examination for the L.D.S., out of 55 separate encounters with the examiners, on no less than 52 occasions were London Hospital students successful. After detailing these and other favourable events, Prof. Wright said he thought this long list of distinctions was unsurpassed in the records of any of the colleges of the University. In conclusion, he referred to the urgent need for improved residential accommodation for students.

Lord Dawson, in presenting the prizes, referred to the work of the Dean—"a man of vision and enthusiasm, and a friend whom no Londoner ever forgets"—and went on to speak of the multiplicity of qualities of head and heart which the medical profession called forth. The unfolding of science and the help it could give to medicine year by year was, he said, illustrated by recent developments with radium, which was going to bring out the necessity for team work. The concluding part of Lord Dawson's speech will be found on p. 85.

The Chairman proposed a vote of thanks, to which Lord Dawson briefly replied.

Freedom Research Entrance Scholarship.—This scholarship in pathology, of the value of £100, tenable at the London Hospital by students of the Universities of Oxford and Cambridge, has been awarded to Mr. J. F. Brock, of University College, Oxford.

DONATIONS AND BEQUESTS.—The late Dr. George Thompson Henderson left £5000 to Guy's Hospital, the income to be used for the general purpose of the hospital other than the medical school.—Mrs. Frances Helen Maria Jacobs, of Fairfield, Lower Shiplake, left £2000 each to the Children's Convalescent Hospital, Beaconsfield, the Medical Auxiliary and Church Society, and the Royal United Beneficent Association, and £1000 to the Wimbledon Hospital.

UNIVERSITY OF ST. ANDREWS. — Mr. Stanley Baldwin will be installed as Chancellor of the University on Nov. 6th and Sir Wilfred Grenfell as Rector on the following day.

DEATHS BY GAS POISONING.—The President of the Board of Trade has appointed a committee to consider the increase during recent years in the number of deaths ascribed to poisoning by coal-gas supplied for domestic purposes, and to make recommendations as to any measures relating to the production and use of gas for domestic purposes which might be taken with a view to diminishing the number of such deaths. The committee consists of Sir Evelyn Cecil (chairman), Sir John Robertson, professor of public health in the University of Birmingham, Mr. R. V. Wheeler, professor of fuel technology in the University of Sheffield, and Mr. F. J. Wrottesley, K.C.; with Mr. H. L. Spencer, of the Board of Trade, Great George-street, Westminster, as secretary.

BROMPTON HOSPITAL FOR CONSUMPTION.—A dinner took place at the Mansion House last week in support of the endeavour to raise £100,000 to provide an adequate annual income for the maintenance of the work of the hospital and money for essential buildings and extensions and the re-equipment of old wards. Lord Reading stated that the hospital has tended a total of 117,000 in-patients and 5,000,000 out-patients.

KING GEORGE'S HOSPITAL, ILFORD.—The Lord Mayor of London has issued an appeal for £50,000, the balance of the amount urgently needed to cover the cost of the first stage of the building operations which have already been begun. The hospital will be a large extension of the existing institution at Ilford with 70 beds; the new scheme provides for 300 beds. Housing schemes have in a short time added 75,000 people to the population of the district.

MEMORIAL TO THE LATE LORD HAMBLEDEN.—Last week the Duke of Connaught unveiled a tablet to the memory of the late Lord Hambleden which has been placed in the entrance-hall of King's College Hospital, of which he was chairman for 20 years. The tablet, which is opposite a memorial to Lord Hambleden's father, the late Rt. Hon. W. H. Smith, whose connexion with the hospital began in 1849, is of granite with a bronze panel bearing an inscription recording his "selfless devotion" to the hospital.

THE REBUILDING OF MIDDLESEX HOSPITAL.—The new west wing is so nearly approaching completion that it is hoped that it will be ready for the reception of patients in October. The building consists of a basement and seven floors. Four of the floors contain 37 beds each and the fifth is a gynæcological unit of 24 beds with its own operating theatre and adjuncts. The walls of the theatre are lined with green-tinted plateglass. The children's ward is on the top floor and has a roof playground. Of the one million pounds which the complete rebuilding will cost over £600,000 has already been obtained.

Medical Diary.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, London, W.

MONDAY, July 15th, to SATURDAY, July 20th.—HOSPITAL FOR DISEASES OF THE SKIN, Blackfriars-road, S.E. Afternoon course in Dermatology. Daily clinical demonstrations. Special demonstrations of interesting cases, Tues. Further particulars from the Secretary.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.

MONDAY, July 15th.—2.30 to 5 P.M., Medical, Surgical and Gynæcological Clinics. Operations.

TUESDAY.—2.30 to 5 P.M., Medical, Surgical, Ear, Nose and Throat Clinics. Operations.

WEDNESDAY.—2.30 to 5 P.M., Medical, Skin, and Eye Clinics. Operations.

THURSDAY.—11.30 A.M., Dental Clinics. 2.30 to 5 P.M., Medical, Surgical, Nose, Throat and Ear Clinics. Operations.

FRIDAY.—10.30 A.M., Throat, Nose and Ear Clinics. 2.30 to 5 P.M., Surgical, Medical, and Children's Diseases Clinics. Operations.

UNIVERSITY COLLEGE HOSPITAL, Gower-street, W.C.

TUESDAY, July 16th.—5 P.M., Sir Thomas Lewis, F.R.S.: The Mechanism of Raynaud's Disease (Victor Horsley Memorial Lecture).

ST. PAUL'S HOSPITAL, Endell-street, W.C.

THURSDAY, July 18th.—4.30 P.M., Mr. Frank Kidd: The Overflow Bladder.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

DEBATE ON THE ADDRESS.

ON Friday, July 5th, the debate on the Address thanking His Majesty for the Gracious Speech to the Throne was resumed.

Hygiene on Merchant Ships.

Dr. VERNON DAVIES urged that an Inter-departmental Committee of the Board of Trade and the Ministry of Health should be set up to inquire into the accommodation on ships for seamen and to report to the House as to whether some action could be taken. The situation of the seamen and fishermen in the mercantile marine, he said, was not quite so good as it might be. Their charter, the Merchant Shipping Act, was passed 30 years ago, and since then the only alteration made for the improvement of the conditions of our seamen was made in 1906 when the cubic capacity was increased from 72 to 120 cubic feet. At the present time a space of 72 cubic feet was supposed to be sufficient for lascars, but for the ordinary sailor it was 120. During the war there was an agreement between the controller of shipping and the people interested in shipping with regard to the conditions as to accommodation and standard ships were built in which the conditions were very greatly improved. The seamen even thought that a beginning of new times was at hand. Unfortunately, however, since that time the same rate of progress had not been maintained, but on the contrary there had been some slight set-back. They had to recognise that there were a certain number of ship-owners who did not give that care and attention to the conditions of their men that they should, and, as in all legislation, it was necessary to legislate for the recalcitrant and the backward. The "Regulations and Instructions for the Survey of Ships" issued by the Board of Trade, which was the guiding principle, had the fault that it simply made suggestions and was not compulsory. In Australia and also in Norway there were Acts of Parliament which made these things compulsory and by that means alone they were gradually but surely stealing ahead of this country in the accommodation provided for their seamen. In Australia there were medical men whose duty it was to supervise the hygienic accommodation in ships. There was nothing of the kind in this country, except in the Royal Navy, where on the staff of the Director-General of Medical Services there was an officer whose duty it was to see that in our warships there were proper hygienic conditions for the men. A recently inspected 1928 vessel, quite good in ordinary equipment, housed sailors and firemen in the forecastle and had only one wash-basin and shower-bath for all the sailors and firemen—20 in number. Another up-to-date vessel provided the sailors with a mess-room in addition to the sleeping room, but both were in the forecastle. Again a vessel with a large crew and a doctor had no hospital. It was a remarkable thing that it was not compulsory to provide a hospital on these ships. Another thing which would astonish the House was that it was not necessary to provide sanitary accommodation on a ship unless the owner wished to count that space for a reduction of dues for tonnage. Parliament had done something for the slums on shore, but it never seemed to enter their heads that these men who brought food to this country should be provided with proper hygienic and sanitary accommodation.

HOUSE OF COMMONS.

THURSDAY, JULY 4TH.

Police Called into Antivivisection Meeting.

Mr. DAY asked the Home Secretary whether his attention had been drawn to the recent disturbances at a meeting of the British Union for the Abolition of Vivisection at Caxton Hall, Westminster; if any request was made to the Metropolitan police authorities to provide adequate police protection on this occasion; and how many were specially detailed for this duty.—Mr. CLYNES replied: Yes, Sir. In response to the original request for police assistance, 12 police were sent and, subsequently, on receipt of a further message, 17 more.

Mr. BOYCE asked the Home Secretary whether he had received representations in regard to the disturbances at the meeting referred to above, and the alleged refusal of the police officers present to turn out the organised disturbers of the meeting unless the entire hall were emptied; whether any instructions were given to the police officers in question by his department; and if he would consider taking some steps whereby public meetings called for lawful purposes should receive the necessary police protection to carry out

the purposes for which such meetings were convened.—Mr. CLYNES replied: The whole incident is under investigation by the Commissioner of Police, and I should prefer to have his report before saying anything further about it. If the hon. Member will repeat his question in a week's time I hope I may then be in a position to reply more fully.

Registrars and Vaccination Exemptions.

Mr. JAMES GARDNER asked the Minister of Health whether he was aware that some of the registrars of births and deaths were refusing to accept statutory declarations from mothers claiming exemption from the vaccination of their children; and if he would take steps to place the mother in the same position as the father for the purpose of the Vaccination Acts.—Mr. GREENWOOD replied: Registrars of births and deaths do not deal with statutory declarations of conscientious objection to vaccination, this being the duty of the vaccination officers appointed under the Vaccination Acts. I am advised that the obligation to cause a child to be vaccinated is placed on the person having the custody of the child, and, consequently, a declaration made by the mother, under the Vaccination Act, 1907, would not exempt the father from liability if he has the legal custody of the child. As regards the last part of the question, any such action would require fresh legislation, which I could not at present undertake to introduce.

Refuse Nuisance at Iver, Buckinghamshire.

Sir ALFRED KNOX asked the Minister of Health whether his attention had been drawn to constant complaints from the Iver district of Buckinghamshire regarding the dumping of London refuse at Iver and Little Britain, in Middlesex; that Mr. Daws, the public cleansing inspector of his department, reported last March that he had found these complaints on local investigation to be well founded; and whether he would see his way to take action to mitigate the nuisance from smoke, smells, flies, and rats, pending the report of the departmental committee recently appointed to recommend permanent measures.—Mr. GREENWOOD replied: I am aware of these complaints. I understand that in one case, where the district council have adopted special by-laws, conditions have improved. In the other case, the local authority have not adopted similar by-laws. I have no legal power myself to deal with particular cases of this kind; but where there is a nuisance or danger to health the local authority can move. The general problem is now being considered by the committee to which the hon. Member refers, and any comprehensive measure must await their report.

Grading of Milk.

Brigadier-General CLIFTON BROWN asked the Minister of Health whether, in view of the frequent misleading of the public by the present system of grading milk as I. Certified, II. Grade A (tuberculin tested), III. Grade A, and IV. Pasteurised, he would alter these designations to Grades A, B, C, and D, so that the purchaser might more easily recognise which was the highest grade of milk.—Mr. GREENWOOD replied: I will bear the hon. Member's suggestion in mind, but to give effect to it would involve the introduction of legislation which I cannot contemplate during the present session.

Panel Patients in Great Britain.

Mr. DAY asked the Minister of Health the number of panel patients at the present time in Great Britain, and the number of doctors who had been removed from the panel; and if he could give particulars.—Mr. GREENWOOD replied: The number of insured persons entitled to medical benefit in 1928 was about 14,800,000; 46 insurance practitioners have been removed from the medical list since 1913, when medical benefit came into operation. The figures relate to England and Wales. Questions relating to Scotland should be addressed to the Secretary of State for Scotland.

Deaths after Vaccination.

Mr. NEIL MACLEAN asked the Minister of Health whether his attention had been called to the coroners' inquests on deaths following upon vaccination; whether he was aware that since July, 1928, there had been 65 cases of serious illness following vaccination, 32 of which proved fatal; and whether he would consider the setting up of a committee of inquiry to go into the whole question of vaccination, and have among the personnel of any such committee representatives of the public.—Mr. GREENWOOD replied: The answer to the first part of the question is in the affirmative. As regards the second part, 27 cases (and not 65) in which symptoms suggestive of disease of the central nervous system following within a month of vaccination were reported to have occurred during the period from July 1st, 1928, to June 30th, 1929. Of these cases 13 were fatal. As regards the third part, the whole question of vaccination has been recently examined by an expert committee, a report by whom was published last year and is now receiving my careful consideration. Investigations are still being made into certain questions by this committee, and I do not consider that any useful purpose would be served by the appointment at the present time of a further committee of inquiry.

Small-pox in West Ham.

Mr. GROVES asked the Minister of Health the total number of cases of small-pox in the West Ham county area since January, 1929; whether the disease had been of a mild character; and what fees had been paid to the public vaccinators for their services from January, 1929, to the end of May.—Mr. GREENWOOD replied: 690 cases of small-pox were notified in the county borough of West Ham during the 26 weeks ended June 29th last. These figures are provisional. The disease has, generally, been of a mild degree. The amount of the fees paid to the public vaccinators in respect of the vaccination of persons resident in the county borough during the three months ended March 31st last was approximately £91. Information as to the fees paid in respect of the months of April and May is not yet available.

Ratification of Washington Convention.

Sir ASSHETON POWNALL asked the Minister of Labour the terms of the announcement made at Geneva with regard to the ratification of the Washington Convention, and to give details of the precise nature of the obligations which they had entered into.—Miss BONDFIELD replied: The statement made by the British Government representative at the recent International Labour Conference was in the following terms: "I am authorised to state that His Majesty's Government in Great Britain propose to take the necessary steps to ensure at the earliest possible moment the ratification of the Washington Hours Convention. That statement requires no further explanation and would only suffer at this moment by further elaboration. I should, however, add that I understand that in introducing the hours legislation necessary His Majesty's Government will take account both of the Washington Convention and the London Agreement." I have nothing at present to add to that statement.

MONDAY, JULY 8TH.

Vivisection of Dogs.

Sir ROBERT GOWER asked the Home Secretary whether it was his intention to introduce legislation prohibiting the vivisection of dogs.—Mr. CLYNES replied: This is a matter on which the Government must be guided by the best possible advice which it can command, and having regard particularly to the carefully considered opinion on the subject which was expressed in the memorandum of the Medical Research Council presented to Parliament in 1927. I am afraid that I cannot undertake to introduce legislation on this subject.

Post-Vaccinal Encephalitis.

Mr. GROVES asked the Minister of Health how many certificates had been received in which the words vaccination or vaccinia or post-vaccinal encephalitis occurred as the cause of death since Jan. 1st this year; in how many other cases did death occur within one month after vaccination; the ages of the persons to whom both sets of death certificates referred; and in which cases were inquests held.—Mr. GREENWOOD replied: Since Jan. 1st, 1929, ten death certificates have been received in which the words "vaccination," "vaccinia," or "post-vaccinal encephalitis" appeared in the coroner's certificate or the medical certificate of the cause of death. The ages of the deceased were respectively 4 weeks, 4 months, 5 months, 6 months, 8 years, 9 years, 10 years, 17 years, 26 years, and 31 years; inquests were held on the persons aged 8 years, 10 years, 17 years, 26 years, and 31 years respectively. In addition I have information of seven cases in which death occurred within one month after vaccination. The ages of the deceased were respectively 9 years, 10 years, two of 13 years, 14 years, 51 years, and 58 years; inquests were held on the persons aged 10 years, 14 years, 58 years, and on one of the persons aged 13 years.

Medical Research in India.

Major GRAHAM POLE asked the Secretary of State for India whether he would inform the House as to why the Report of the Committee on the Organisation of Medical Research in India has not been published; whether he was aware that the All-India Medical Congress had urged its publication; whether any protests had been received against the proposed location of the Central Medical Research Institute at Dhera Dun; and if the legislative assembly would be consulted before any decision was taken.—Mr. WEDGWOOD BENN replied: I am informed that this report was published about five weeks ago. Some protests were made against the location of the Central Medical Institute at Dehra Dun; but the expenses for the scheme as proposed were approved on Jan. 29th by the Standing Finance Committee of the Legislative Assembly.

Veterinary Training in London.

Lieut.-Colonel FREMANTLE asked the Minister of Agriculture whether he had yet received the Report of the Committee appointed to consider the existing facilities for training veterinarians in London; whether this report would be published as a Parliamentary Paper; and, if so, when.—Mr. BUXTON replied: No, sir; but I understand that the Committee has reached the stage of considering a draft report. When the report is received it will be printed and published, and copies will be available for the use of members.

Health of Miners in Rhodesia.

Lieut.-Colonel FREMANTLE asked the Under Secretary of State for the Colonies, whether the governor of Northern Rhodesia had been asked to submit proposals for the removal of the capital of that territory from Livingstone; whether, in view of the new mining developments in the copper field in that country, any special arrangements were contemplated in regard to the recruitment, supervision, health, and education of natives employed in connexion with the copper mines; and whether these matters would be under the direct control of the government or left to the mining companies.—Mr. PONSONBY replied:—The reply to the first part of the question is in the affirmative. Education is controlled directly by the Government; recruitment, housing, and health are controlled by the mining companies under Government regulation and inspection. The Government already has ample powers in connexion with these matters, but the Secretary of State is not satisfied with the information which he has received with regard to the health of the miners and he has called on the governor for further report and recommendations. Special arrangements for education of the natives at these mining centres are under the consideration of the Advisory Committee on Education in the Colonies. I may add that a revised mining Law is in course of preparation.

Veterinary Services in the Colonies.

Lieut.-Colonel FREMANTLE asked the Under Secretary of State for the Colonies what action was being taken to give effect to the recommendations of Lord Lovat's Committee on the development of veterinary services in the Colonial Empire, and, in particular, whether the scholarship scheme for recruiting and training veterinary officers for Colonial governments was being proceeded with; and whether it would come into operation this year.—Mr. PONSONBY replied: A despatch was addressed to Colonial Governments in April last dealing with the recommendations of this Committee and asking for their observations upon them. Replies to this despatch are now being received. In view of the present lack of qualified candidates the Secretary of State is of opinion that the first step towards the further development of the Colonial Veterinary Services should be the institution of the scholarship scheme which the Committee recommended, but he fears that it will not be possible to bring this scheme into operation this year.

Hydro-Therapeutic Treatment for Insured Persons.

Dr. MORRIS-JONES asked the Minister of Health whether he was aware that a scheme had been submitted by the British Spa Federation to provide hydro-therapeutic treatment for insured persons suffering from chronic rheumatism as an additional benefit under the National Health Insurance Act; and whether such scheme had received the sanction of the Ministry.—Miss SUSAN LAWRENCE (Parliamentary Secretary to the Ministry of Health) replied: The answer to the first part of the question is in the affirmative. The proposed scheme has received careful consideration, but has not yet been sanctioned. The present list of additional benefits already affords to approved societies a wide variety of forms of remedial treatment from amongst which they may select those to which the limited funds available for the purpose out of their disposable surpluses shall be allocated, and before adding further benefits to that list my right hon. friend would require to be satisfied that there was a fairly widespread desire on the part of societies for such an extension.

Salary of a School Dentist.

Mr. THORNE asked the President of the Board of Education whether his attention had been called to an advertisement inviting applications for appointment as a school dentist to the West Ham education committee at a salary of £450 a year, rising by annual increments of £25 to £500; that the advertisement had been declined by three professional publications on the ground of the salary being below scale; and whether the proposed salary was authorised by his department.—Sir C. TREVELYAN replied: I am aware that the West Ham Education Committee propose to appoint an additional school dentist, but the circumstances referred to by the hon. member have not previously been brought to my notice. The Board have not prescribed or authorised the salary of this or any other school dentist.

TUESDAY, JULY 9TH.

Adoption of Children in Scotland.

Sir GEORGE PENNY asked the Secretary of State for Scotland whether an Adoption of Children (Scotland) Bill would be introduced on the lines of the English Adoption of Children Act.—Mr. ADAMSON replied: The question is receiving consideration, but I am unable at present to give any undertaking as to legislation.

War Pensions Administration.

Mr. KINGSLEY GRIFFITH asked the Prime Minister whether it was proposed to obtain powers to remove the pension grievances of ex-Service men and their dependants as specified in the proposals of the British Legion, and in particular with regard to the operation of the seven-year limit.—Mr. F. O. ROBERTS (Minister of Pensions) replied: Representatives of the British Legion have submitted certain proposals to me on various matters connected with the administration of war pensions, and these are having my immediate consideration. The point mentioned in the questions is certainly to be dealt with, but I cannot at this early date announce any definite decision. In the meantime I may say that the necessary steps are being taken to ensure that no case shall be rejected merely on the ground that it is submitted beyond the time-limit.

Protection against Air Gas Attack.

Brigadier-General CLIFTON BROWN asked the Prime Minister whether the committee which has been considering plans for the protection of the civil population from attack from the air by poison gas had yet evolved a scheme, and, if so, whether the British Red Cross and local authorities were taking steps to operate it in case of necessity.—Mr. RAMSAY MACDONALD replied: In view of the recent ratification of the Geneva Gas Protocol of 1925 by most of the important European States, including this country, I do not think this is a moment to press the local authorities to develop plans for the protection of the civil population against gas attack. Much preparatory work had, however, been done by the Committee of Imperial Defence upon this problem prior to the ratification of the Protocol, and that work will not be thrown away if, unfortunately, a situation should hereafter arise requiring as a measure of prudence the development of plans for this purpose.

Children in Slum Areas.

Mr. SIMON asked the Minister of Health whether he was aware that there were actually more children living in slums to-day than ten years ago, and whether he was prepared to enable their parents to move them into decent houses by some form of children's rent allowance.—Mr. GREENWOOD replied: I am aware of the unsatisfactory conditions under which many families are living. The provision of better accommodation for such families is one aspect of the general problem of the slums which is engaging my attention; but the hon. Member must not assume that I accept his view that the adoption of a system of children's rent allowances is a solution of this problem.

League of Nations and Radium Supplies.

Commander BELLAIRS asked the Minister of Health what steps had been taken in regard to international action as to the supply and price of radium; and whether the report of the Radium Subcommittee of the Committee of Civil Research had been brought to the notice of the League of Nations.—Mr. GREENWOOD replied: The report of the Radium Subcommittee has been brought to the notice of the League of Nations Health Organisation. As regards the supply and price of radium there is for the time being nothing to add to the reply given on April 18th.

Food Value of Half-Meat Cheese.

Mr. REMER asked the Minister of Agriculture if his attention had been called to the importation of large quantities of cheese from Holland and elsewhere which was sold at low prices as cheese, but which was known in the trade as half-meat cheese, and, in view of the low food value of this cheese, if he would take steps to see that this cheese was labelled half-meat cheese.—Mr. ADDISON (Parliamentary Secretary to the Ministry of Agriculture) replied: The question of the sale of both home-made and imported half-meat cheese has been constantly before the Ministry for some time past. Local authorities under the Food and Drugs (Adulteration) Act, 1928, have power to deal with cases where it is sold under a name which indicates that it is whole-milk cheese, and convictions have been obtained from time to time. In the opinion of my right hon. friend the fresh legislation which the hon. Member's proposal would involve could not at present be justified.

Scottish Local Authorities and Local Government Act.

Mr. DUNCAN MILLAR asked the Secretary of State for Scotland the number of resolutions he had received from town councils, education authorities, parish councils, and other public bodies in Scotland, respectively, calling for the suspension of the operation of the Local Government (Scotland) Act, 1929, until it had formed the subject of further inquiry or for the amendment of the provisions of the Act.—Mr. ADAMSON replied: The numbers are as follows: town councils, 23; education authorities, 7; parish councils, 59; other public bodies (including the Association of Education Authorities), 2.

Appointments.

WOOD, E. A., M.B., B.S. Lond., has been appointed House Surgeon to the Swindon Victoria Hospital.

Certifying Surgeons under the Factory and Workshop Acts: HAMILTON, A. B., M.B., Ch.B. Glasg., D.P.H. (Tipton District of Stafford); HUTCHISON, T. P., M.B., Ch.B. Glasg. (Muirkirk District of Ayr); and MORTIS, R. H., L.R.C.P. Lond., M.R.C.S. (Hertford).

City of London Maternity Hospital: ALLAN, W.B., M.B., B.S. Durh., Senior Resident Medical Officer; TAIT, C. B. V., L.R.C.P. Lond., M.R.C.S., Junior Resident Medical Officer.

Glasgow Royal Maternity and Women's Hospital: CROCKETT, MARGARET G., M.B., Ch.B. Glasg., and FULTON, J. B., M.B., Ch.B. Glasg., Indoor House Surgeons; SIMPSON, J. R., M.B., Ch.B. Glasg., and BARROWMAN, JEAN M., M.B., Ch.B., Outdoor House Surgeons.

Vacancies.

For further information refer to the advertisement columns.

Ashton-under-Lyne District Infirmary.—Asst. Radiologist. £500.
Bethnal Green Hospital, E.—Asst. M.O. £350.
Birmingham and Midland Homœopathic Hospital and Dispensary, Easy-row.—H.S. £150.
Birmingham City Mental Deficiency Institution, Coleshill Hall.—Med. Supt. £700.
Birmingham General Hospital.—Res. Surg. Reg. £100–£140.
Birmingham University.—Walter Myers Travelling Studentship £300. Also Lecturer in Physiological Dept. £400.
Bolton County Borough Education Committee.—Asst. School M.O. £600.
Bootle Borough Hospital, Derby-road.—Sen. M.O. Also Two Jun. M.O.'s. At rate of £130 and £125 respectively.
Bournemouth, Royal Victoria and West Hants Hospital.—H.S. At rate of £120.
Bradford Royal Infirmary.—Two H.S.'s. Each £150.
Brighton. Royal Sussex County Hospital.—H.S. £150.
Bristol General Hospital.—H.P.'s and H.S.'s. Also Obstetric Officer. Each at rate of £60. Also Cas. H.S. At rate of £80.
Bristol Royal Infirmary.—Sen. Res. M.O. £200. Also Res. HS.'s. to Special Departments. At rate of £60. Res. Cas. H.S. and Dental H.S. At rate of £80 each.
British Red Cross Society's Clinic for Treatment of Rheumatic Diseases, Park Square East, Regent's Park.—Med. Supt. £600.
Burton-on-Trent General Infirmary.—Second Res. H.S. £150.
Cairo, Egyptian University.—Prof. of Clinical Pathology. £E.1500.
Cardiff Royal Infirmary.—H.S.'s and H.P.'s to Special Depts. Each at rate of £50.
Chester Royal Infirmary.—H.S. and Cas. O. £120.
Derby, Derbyshire Hospital for Women.—Hon. Asst. S. Also H.S. At rate of £150.
Dorset County Council.—Asst. School Dentist. £450.
Dreadnought Hospital, Greenwich.—Asst. Radiologist. 50 gns.
Dundee Royal Infirmary.—Visiting M.O.
Eastbourne, Princess Alice Memorial Hospital.—Jun. H.S. At rate of £100.
Evelina Hospital for Children, Southwark, S.E.—H.S. At rate of £120.
Exeter, Royal Devon and Exeter Hospital.—Asst. H.S. At rate of £100.
Exminster, Devon Mental Hospital.—Jun. Asst. M.O. £300.
Gloucester, Gloucestershire Royal Infirmary, &c.—Second H.S. At rate of £100.
Great Yarmouth General Hospital.—Jun. H.S. £100.
Greenwich Union.—Fifth and Sixth Asst. M.O.'s. Each £300.
Guy's Hospital, Venereal Diseases Clinic, S.E.—Three M.O.'s. Each £365.
Holborn and Finsbury Hospital, Archway-road, N.—First Asst. M.O. £500.
Hull Maternity Home and Infants' Hospital, Hedon-road.—Res. M.O. £450.
Ilford Emergency Hospital.—H.S.'s.
Invalid and Crippled Children's Society's Hospital, Balaam-street, Plaistow, E.—H.S. to Ear, Nose and Throat Dept.
Liverpool, David Lewis Northern Hospital.—Med. Tutor and Registrar. £120. H.P.'s and H.S.'s. Also Hon. Anæsthetists.
London Jewish Hospital, Stepney Green, E.—Hon. M.O. for Actino-Therapeutic Dept. Also Out-Patient Asst. At rate of £50.
Lowestoft and North Suffolk Hospital.—H.S. £120.
Maidstone, West Kent General Hospital.—Hon. Anæsthetist.
Malayan Medical Service.—Asst. Med. Supts. for Mental Hospitals at Singapore and Tanjong Rambutan. Each £700.
Manchester City.—Asst. Tuberculosis Officer. £650.
Marseilles, Queen Alexandra Memorial Hospital.—Res. M.O. At rate of £150.
Middlesex Hospital.—Asst. to Ophthalmic Dept. £100.
Newcastle-upon-Tyne, Education Committee.—Asst. S.M.O. £650.
Nottingham General Hospital.—Two H.S.'s for Special Depts. Each at rate of £150.
Oldham, Royal Infirmary.—H.P.'s and H.S.'s to Special Depts. Each at rate of £175.
Oswestry, Shropshire Orthopædic Hospital.—H.S. £200.
Plaistow Fever Hospital, E.—Second Asst. M.O. £300.
Preston and County of Lancaster Queen Victoria Royal Infirmary. H.P. Also H.S. Each at rate of £150.
Prince of Wales's General Hospital, Tottenham, N.—Hon. Asst. P.
Princess Louise Kensington Hospital for Children, North Kensington.—Hon. Radiologist.
Rochester, St. Bartholomew's Hospital.—H.P. At rate of £175.
Rotherham Hospital.—Sen. H.S. £200.
Royal Army Medical Corps.—25 Commissions.
Royal London Ophthalmic Hospital, City-road, E.C.—Gifford Edmond's Prize in Ophthalmology. £100.
Royal Waterloo Hospital for Children and Women, Waterloo-road, S.E.—Cas. O. £150.
St. Albans, Napsbury Mental Hospital.—Jun. Asst. M.O. £485.
St. Andrew's Hospital, Devons-road, Bow, E.—Three Asst. M.O.'s. Each £350.
St. Mary's Hospital for Women and Children, Plaistow, E.—Res. and Asst. Res. M.O.'s. At rate of £175 and £120 respectively.
St. Thomas's Hospital.—Three Med. Regs. Each £250.
South Africa, Bloemfontein Hospital.—Sister for X Ray and Electrical Dept. £300.
Stoke-on-Trent, North Staffordshire Royal Infirmary.—H.S. £150 Also H.S. to Ophthalmic and Aural Depts. At rate of £150
Swansea Hospital.—Cas. O. £150.
Torquay, Torbay Hospital.—Hon. Surgeon to Surgical Out-patients.
University College Hospital.—First Hon. Asst. to Ear, Nose and Throat Dept.
West End Hospital for Nervous Diseases, Gloucester Gate, Regent's Park, N.W.—Jun. H.P. At rate of £100.
West London Hospital, Hammersmith, W.—Aural and Ophth. H.S. and Res. Asst. Cas. O. At rate of £100. Also Res. Anæs. At rate of £100.
Willesden General Hospital, N.W.—Clin. Assts. to Special Depts.
Windsor, King Edward VII. Hospital.—Third H.S. At rate of £100.
Wolverhampton Royal Hospital.—Hon. Surgeons to Ear, Throat and Nose Dept.
Woolwich and District War Memorial Hospital, Shooters-hill, S.E. H.P. and H.S. Each at rate of £125.
Worcester County and City Mental Hospital, Powick.—Jun. Asst. M.O. £350.
Wrexham and East Denbighshire War Memorial Hospital.—Res. H.S. At rate of £150.

Births, Marriages, and Deaths.

BIRTHS.

DYKE.—On July 8th, at a nursing home, to Janet, wife of Dr. S. C. Dyke, of 9, George-street, Wolverhampton—a son.

HANAFIN.—On June 26th, at Liverpool-road, Chester, the wife of Lieut.-Colonel J. B. Hanafin, C.I.E., I.M.S., of a daughter.

LEWERS.—On June 30th, at Castle Hill, Ilfracombe, the wife of Dr. H. B. Lewers, of a daughter.

LOWE.—On June 29th, at Rey Bridge, Lacock, Wilts., the wife of Dr. John Burman Lowe, of a daughter.

REID.—On July 4th, at Rodney-street, Liverpool, the wife of Andrew McKie Reid, M.C., F.R.C.S., of a son.

MARRIAGES.

CARR—BOXALL.—On July 4th, at St. James's Church, Abinger, Dr. Stephen Alan Carr to Irene, only daughter of Mrs. R. Boxall and the late Robert Boxall, M.D., of Ingleside, Abinger Common.

ROUSE—MURRAY.—On July 6th, at the Parish Church of St. James, Paddington, Dr. James Edward Colleton Rouse to Nancy Mary Louise, younger daughter of Dr. and Mrs. Richard Galway Murray, of Sussex-gardens, W.

DEATHS.

BRUCE.—On July 7th, at Harley-street, John Mitchell Bruce, in his 83rd year.

FENTON.—On July 4th, at Croft Lodge, Brackley, John Samuel Fenton, B.A., M.D. (T.C.D.), in his 68th year.

GALE.—On July 5th, Arthur Knight Gale, M.R.C.S., L.R.C.P., of South Mount-terrace, York, late of Woodseats, Sheffield, aged 70.

HARDENBERG.—On July 2nd, at Frederica-road, Chingford, Emile John Frank Hardenberg, M.R.C.S., L.R.C.P. Lond., aged 52,

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

THOUGHTS ON UNIVERSITY COLLEGE.

An Address delivered to the Assembly of Faculties of the College on July 4th,

By Sir Walter Fletcher, K.B.E., M.D., F.R.S.,
SECRETARY OF THE MEDICAL RESEARCH COUNCIL.

[Sir Walter Fletcher began his address by regretting the impending resignation of the Provost, Sir Gregory Foster, and continued :—]

I think it a high and a quite unmerited honour that I should have been allowed, among so many distinguished guests to-day, to be your special visitor and to receive, as I have done on your behalf, the scholars, medallists, and prizemen of the year. They have well shown by their achievements how lively is the spirit of endeavour here, and how high the level of performance. We congratulate them heartily ; and to them and to all the graduates of the year now passing on to the next stages of their chosen work we bring our warmest good wishes. To stand here as I do now, your visitor to-day, gives me emotion for private and personal reasons, of which I hope you will allow me to speak briefly. I cannot help reflecting that more than 80 years ago my own father came here as a student. He was born almost in the same week as that of the foundation of the College itself. Debarred from Cambridge by the test then imposed of signing the Thirty-nine Articles, he came to this place of free learning. Here he found great teachers like Arthur Clough in English literature, de Morgan in mathematics, Graham and Williamson in chemistry, and to those men and to others here he never failed to acknowledge a lifelong debt. He might have found mathematicians technically more competent at Cambridge, though de Morgan can have had no equals even there in the kind of inspiration he gave. As to chemistry, he could have found no practical instruction at all in either Oxford or Cambridge at that time. It was not till three years later that Prof. Liveing, at Cambridge, began his first practical class in a small cottage hired for that purpose.

Family and Personal Indebtedness.

Will you pardon me if I recall some of the memories on which my father was fond of dwelling ? In his years here, just at the mid-century, University College was not far from the edge of the town, with many green fields between it and Hampstead. My father's home was then considered to be far in the country ; it was among fields and gardens at the top of Denmark Hill. Transport from Denmark Hill was not then what it is now, though I may say that his elder brother, an engineer, had already made a steam road-car and had successfully driven it from Reading to Maidenhead in 1843. For my father the daily journey from Denmark Hill to College took too long. He hired rooms in Gower-street, and used to come in on Monday mornings by a horse omnibus from the bottom of Denmark Hill for the week at College. He did his light reading in the 'bus, and for that purpose he commonly used the monthly parts of " Dombey and Son " and then of " David Copperfield," in their green paper covers, as they were written by Charles Dickens in his house at Doughty-street, half a mile from here. One of my most prized possessions is the gold medal for chemistry my father gained here in 1851, receiving it, I suppose, at some such ceremony as this. My family piety impels me to boast that the runner-up for the medal on that occasion was Sir Henry Roscoe, whose friendship my father gained here and enjoyed for over sixty years. You will understand how keenly I feel the pleasure of being allowed to come to this assembly of the faculties, and of being able thus to acknowledge here my father's lifelong affection for this College, and his lasting gratitude for all he owed to it. I owe so much to him that his debt to you is mine. I can only attempt to repay it by the honour and respect I give to this home of young life and friendship, this great house of learning and research.

This family debt I owe to University College is by no means the end of my debtor's account. In my father's time, and for a quarter of a century longer, that inspiring teacher, William Sharpey, was Professor of Physiology and Anatomy here. Of his immediate pupils, Michael Foster passed from this College to found the school of physiology at Cambridge, and in large degree indeed to found the whole group of modern biological sciences there. While Burdon Sanderson carried fire from the same torch to Oxford, and Schafer, happily still with us, bore it to Edinburgh. From those missioners of Sharpey and of University College at those three centres have come living developments clearly traceable in their perennial fertility though quite incalculable in extent, and not only in Great Britain but throughout the world. But I dare not begin to say more of this now. Of Foster no Cambridge man can speak without gratitude, and no pupil of his without glowing affection. I have here again to confess for his sake an obligation to this College which I share with so many others.

The Greatness of Lord Haldane.

The Provost in giving his interesting record of the past academic year said rightly that this year has been momentous in the history of London University. The new constitution of which this year has seen the birth, will bring fresh unity and effectiveness to the University. In so far as it does that it cannot fail to enrich the opportunities of this College for adding fresh lustre to its long and unparalleled history of service—of service devoted from the first to all those ideals that rightly belong to university life and work in London. There must be many here to-day whose reflections have been deeply stirred not only by thoughts of this but by another event also within the past year, and just recalled to us by the Provost. I mean the death of Lord Haldane, who formerly gave devoted effort here as Vice-President of the College Council and whose desire, stronger perhaps than any other desire of his life, was to see and to aid the advancement of those great purposes for which this College stands. For much more than 30 years he had given time and work lavishly to the cause of university reform in London. The story of those long, intricate, and controversial labours lies on record. To-day we think of him as a past officer here whose life has ended just as the seal was being set upon what it had so long been his object to secure.

I am sure you will think it right that on this occasion, and in this assembly of university men, that we should hold Lord Haldane in special remembrance. It is surely true to say that no man of his own or any other generation has done more to promote the growth of university education in this country. He saw clearly that not only the soul but the material welfare and even the safety of Great Britain were being endangered by our national neglect of university education. Throughout his long life he saw clearly and taught strenuously the true ideals of university life. He toiled ceaselessly in hard labour by day and night through clouds of controversy, through banks of apathy, and among intricate mazes of political and financial difficulty until he had secured the foundation in enduring form of one part after another of our national university system. If we look back upon what he actually did, the tale is almost incredible. His work for London University for over 30 years makes a drama known to you all. The present university system in Ireland was due to his conception, hard work, and diplomacy, though he gave others the credit. The foundations of Liverpool University and of the other civic universities that followed it were due in large part to him. His was the chief hand in framing the university system for Wales. He was foremost among the founders of the Imperial College of Science, and his work and influence were vital for the beginnings of the University Grants Committee and the Scientific and Industrial Research Department. For most men, Lord Haldane's service to education would represent whole-time labour for a lifetime. Yet he did it as a labour of love, while he was engaged in a huge professional practice at the Bar, and later, while he was Secretary of State for War, the busiest and greatest we ever had, and while he was Lord Chancellor. Already, as each year passes, the truth about his work is becoming more clearly known. His multiple achievements stand out in their mass as we recede from them in time. Unlike so many of his colleagues in the public service, Lord Haldane had no arts of the demagogue, natural or acquired. He had no gift of voice, no picturesque appearance. Devoid of all art in self-advertisement, he offered to the public in his writings and speeches an aspect which to the half-educated had no practical message. Even in his professional work at the Bar his massive success was won not by words cleverly spun before juries, but by his intellectual advocacy before the trained minds of the highest courts. These deficiencies in personality, if they were deficiencies, account for the tragedies of his life which he faced with such dignity and unselfishness. In the words of Lord Haig, which only echo those of all professional soldiers, Lord Haldane was the greatest War Minister this country has ever had. In the face of entrenched conservatism and financial stringency, he created the Imperial General Staff, the Officers' Training Corps, the Territorial Army, and that Expeditionary Force which the German commanders admitted to be incomparably effective. Yet for want of a few bold words of truth, openly spoken by the political colleagues who best knew his work, the country lost his services at the very time when it was being saved by the fruits of his work and when our further need of him was so great. Even Haig, in the hour of his triumph, had not the bravery to pay openly to Haldane the written

tribute I have just quoted. He permitted himself to be content at the time with paying him a secret evening call. But if the Cabinets Lord Haldane served and the Army he created have run the risk of losing the respect of posterity by their great sins of omission, we who belong to university life must not fail with them, and must openly declare our debt. Haldane's future fame is assured, for it stands on the rock of performance, and it will live when the lesser men who failed him will have been long forgotten.

University College and University Ideals.

Here at University College are surely both the conditions and the embodiment of the university ideals that Lord Haldane so strenuously upheld. Of those ideals, one of the chief is represented by the very fact that this red letter, or red gowned, occasion is called the Assembly of the Faculties. I take this as marking your attachment to the principle that all branches of knowledge should be brought in such close relation within a true university that there may be in each part a sympathetic understanding of the work of all other parts, of their mutual relations, their possibilities and limitations. This College has not grown as the modern universities of the country have in the main grown, by the successive grafting of new faculties on to schools of technical instruction. University College has been a complete University from the beginning, and was indeed for long the only complete University in the country, having a full Faculty of Arts, including Fine Arts and Architecture. From the beginning, too, your faculties have been in close association both in place and in spirit. Only so can the true function of a university be realised. Only by taking the whole realm of human thought and experience for its kingdom can it bring workers in all the divers fields into a full community, effectively impose its distinctive influence upon them, and imbue them with one spirit and one aim. That spirit of the university must be the sense of a fundamental unity of purpose residing in every kind of creative work, whether in art, in letters, or in science. That single aim must be the conscious direction of all the powers that spring from knowledge or skill towards the promotion of the highest ends. Here is the true religion, and this College has always been faithful to it. We can afford to smile at the old nickname of the "godless University," once given to it by a narrow and sectarian jealousy.

The intercourse of different faculties, so vital if the university spirit is to be maintained, is actually endangered by the multiplication of human knowledge. As the boundaries of the body of knowledge are extended by research, the individual workers at the points of growth find themselves more widely separated along the advancing periphery. Yet growth at any point may cease unless it receives fresh impetus from some cross-contact with other parts, perhaps apparently distant parts, of the field of knowledge. This gives a practical reason of daily importance for the close contact of faculties which only reinforces the spiritual reasons that come first. The distinguishing character of university work depends upon this university spirit; it does not depend at all upon the mere complexity of the instruction given. Yet the university fails unless the students within it learn not only the value of truth but the difficulty of gaining it. I have sometimes passed through your main entrance hall and seen the students hurrying about their business, and upon the walls the silent witness of those members of the College who gave their lives in the war. More than once, as I have seen this, I have thought of those words of Bishop Hall, of Norwich, in the seventeenth century, "God sells knowledge for sweat; as he doth honour for jeopardie." Knowledge indeed comes only by effort, and a true university will always inspire those possessing it to use it and spend themselves freely in the public service, not caring to count the risks.

University College and Its Neighbours.

If I may say one last word, it will be in reference to some benefactions within and near this place. Great new opportunities of applying in practical directions the knowledge gained here in the primary sciences have come in recent years to the College. Grouped near your laboratories of primary study are buildings for the applied sciences of engineering, of technical chemistry, and to these there are some parallels also upon the literary side. You are intimately bound in coöperation with the Medical School and Hospital across the road, while close at hand there has arisen the great new School of Hygiene and Tropical Medicine to which you are already giving your assistance. The view is sometimes taken, I think carelessly, that technical schools of these kinds are not truly within the province of university study as such. I think that is a profound mistake for a double reason. We believe first that what gives the university character to any study is the spirit in which it is undertaken and the direction of the aim pursued. We know, moreover, that applied science, while it offers an outlet and a field of trial for the results of pure science, does more than this, for it is continually suggesting new problems for research work of a fundamental kind.

As in private duty bound, I would here refer in particular to your new neighbour, the London School of Hygiene and Tropical Medicine, which is to be opened within a few days. From my own relations to the school I know how confidently it hopes for your continued coöperation, and how keenly it desires to join in service with you to its fullest power. It offers work to post-graduate students in all the wide and varied fields of knowledge that now serve preventive medicine. The School has been founded in order to bring all the resources of science to aid the protection, right use, and development of human life at home and throughout the Empire. These great utilitarian needs can be met rightly only in the light that scientific work begins. That work must have its roots in the disinterested pursuit of primary learning. Its close association with this place will bring to it, I hope, much more than an exchange of practical services. I pray that there may be realised within the new School, as within this College, the true and inner meaning of university work. The satisfaction of material needs is not to be our first consideration. Within a university it should become instinctive for us to see that the name of truth is hallowed before we seek our daily bread. I would that the School may learn that first lesson from your example and from your long tradition.

CLEAN MILK.

ON July 9th at the Express Dairy Company's Farm at Finchley a demonstration was given of the making and filling of a new milk container which has been named the "Sealcone." This container is made of thick soft paper which is sterilised and made impervious to fluid by hot wax. The paper is passed through a forming machine, which makes the cone; the cone is then passed through a tank of hot wax, before being carried by machinery to the filling and sealing stations. Here an operator works a tap in connection with the milk supply, so that the cone is filled with milk; it then is placed under a machine by which it is hermetically sealed. Thus every pint of milk can be delivered as between the dairy and the consumer without risk of contamination. The milk can be kept sweet in the containing cone for such a considerable period as a week, and the firm states that specially cooled milk shows no sign of deterioration in a month. The sealed cones can be sold to the public from the counter without a money deposit upon them, as there is no need to return them.

OVERHEARD AT THE SEASIDE.

To the Editor of THE LANCET.

SIR,—The following was overheard on the pier at the seaside:—

First female: "You should take *my* doctor's advice; he used to be just a doctor, an ordinary common doctor, you know; but now he's dropped all that; he's an *olive oil* specialist; he says it's the one thing; if you've a pain you rub it on outside, and you drink glasses of it."

Second female (much impressed): "There now! And it's in the Bible, too!"

I am, Sir, yours faithfully,

C. WILLETT CUNNINGTON.

Dollis-avenue, Church End, Finchley, July 4th, 1929.

SOUTH HANTS AND SOUTHAMPTON HOSPITAL.

ON Friday in last week Prince George opened a new wing, named after Colonel Sir Edward King Perkins in acknowledgment of his services to the institution. The wing consists of two main wards named respectively after Dr. N. E. Aldridge, formerly senior physician of the hospital, and Mr. G. H. Cowen, senior surgeon, and six single bed wards named after benefactors. The extensions, which provide 84 additional beds, have cost £30,000. In declaring the new wing open Prince George spoke of the "Hospital House Ballot" which had produced £5000. The house was built by Southampton trade-unionists in their spare time, with materials supplied by the master builders, both labour and materials being given as contributions to the hospital.

INDEX TO "THE LANCET," VOL. I., 1929.

THE Index and Title-page to Vol. I., 1929, which was completed with the issue of June 29th, is now in preparation. A copy will be sent gratis to subscribers on receipt of a post-card addressed to the Manager of THE LANCET, 1, Bedford-street, Strand, W.C. 2. Subscribers who have not already indicated their desire to receive Indexes regularly as published should do so now.

Lectures

ON THE

PHYSIOLOGY OF GLYCOGEN

AND THE

RÔLE OF INSULIN AND EPINEPHRINE IN CARBOHYDRATE METABOLISM.

Delivered at the London Hospital

BY J. J. R. MACLEOD, M.B., LL.D. ABERD., D.SC. (HON.) TORONTO, F.R.S.,

REGIUS PROFESSOR OF PHYSIOLOGY IN THE UNIVERSITY OF ABERDEEN.

LECTURE II. (PART II).*

EFFECT OF INSULIN ON CARBOHYDRATE BALANCE IN THE RAT.

OTHER researches bearing on our present problem are those of C. F. and G. T. Cori, in which an attempt has been made to compare the fate of ingested glucose in white rats injected with insulin with that in uninjected rats, by determining the amount of sugar absorbed and that oxidised and stored as glycogen. When glucose was given, by stomach-tube, to rats previously starved for 48 hours, it was found that between 86 and 90 per cent. of the amount which disappeared from the gastro-intestinal tract in a period of four hours could be accounted for, a similar total balance being obtained when insulin was injected at the time of administering sugar.† There was a difference, however, in the manner of utilisation of the sugar, as was ascertained by comparing the relative amounts of glycogen formed and of glucose oxidised in the two cases. Relatively more carbohydrate was oxidised and less deposited as glycogen under the influence of insulin. The ratio, $\frac{\text{glycogen formed}}{\text{glucose oxidised}}$ changed from 1·38 in normal rats to 0·87 in those injected with insulin, and, since it was known that the liver glycogen becomes less under these conditions, it was concluded that the glycogen deposited elsewhere in the body either remains unchanged or increases somewhat.

According to the Cori's, therefore, excess of insulin leads to an increased sugar oxidation and they claim that the results are of such a quantitative character as to disprove the hypothesis that some unknown carbohydrate is formed. I am doubtful as to whether this claim to strict quantitative accuracy is justifiable. In the first place, the method used for determining the quantity of sugar absorbed from the intestine does not take into consideration any possible loss through bacterial decomposition, or a slowing in the rate of absorption, due to reduction in strength of the sugar solution as less and less remains in the intestine to be absorbed. The authors state, however, that they have shown that neither of these possible errors was involved. But even if the income side of the balance sheet could be vouched for, the dependability of the items on the expenditure side is questionable. For example, the calculation of the amount of carbohydrate oxidised is based solely on an average increase in R.Q. from 0·838 to 0·882, no change in oxygen consumption being observed. Consideration is not given to the possibility, that some change in the alkaline reserve of the blood and tissues, or a depression in the process of gluconeogenesis, may have been factors accounting for the altered R.Q. It is to be noted also that no allowance is made in the insulin-treated animals for reduction in the free sugar of the blood or of the liver, which these workers themselves have demonstrated, or of the muscles which Dale, Best, &c., say occurs. This would add something to the credit side of the balance sheet in the case of the insulin-treated animals.

Different Sugars not Affected Alike by Insulin.

I have referred to the first of the series of papers by the Cori's (1926),[40] and now let me say something about two more recent ones (1928). In the first of these,[41] comparison is made—in rats previously starved for 24 (instead of 48) hours—of the rates of absorption of glucose, fructose, and dihydroxyacetone, and of the balances between the amounts of each of these sugars actually absorbed and those accountable for by oxidation and glycogen formation.

It is stated that absorption is more rapid after 24 hours' starvation than after 48 hours, and that the manner of disposal of the absorbed glucose also differs. Both oxidation and glycogen formation were absolutely greater after the shorter period of starvation and relatively more glucose was oxidised, as evidenced by the quotient, $\frac{\text{glycogen formed}}{\text{glucose oxidised}}$ being 1, as compared with 1·38 for the rats starved 48 hours. The glycogen deposited in the liver, however, was the same for both, so that relatively more must have been formed in the muscles of the 48-hour rats. These results show a most remarkable change in the nature of the metabolic processes after different periods of starvation. But our chief interest at present is concerned with the effect of insulin, and in this connexion we must regard all three sugars. If the rate of absorption of glucose be taken as 100, that of fructose is 51 and dihydroxyacetone 65. Insulin was found to have no influence on these absorption ratios, and it produced little change on the percentage of the absorbed sugar which could be accounted for by increased carbohydrate combustion *plus* glycogen deposition. What insulin did do was to alter the proportion of the absorbed sugar disposed of by each of the processes. This is shown in Table IX. which has been compiled from the data in Cori's paper. In the case of all three sugars it is seen that insulin‡ caused less glycogen to be deposited in the liver and more in the muscles, the extent of the decrease in the former being about proportional to that of the increase in the latter in the cases of glucose and dihydroxyacetone, whereas in that of fructose the loss in the liver was proportionately greater than the gain in the muscles. Consequently increased combustion of carbohydrate was pronounced only with fructose. This means that excess of insulin in the body causes glucose and dihydroxyacetone to be locked up as glycogen in the muscles and fructose to be oxidised; leaving, in all three cases, practically no sugar available to be formed into glycogen in the liver. Utilisation of sugar in the muscles therefore runs ahead of glycogen formation in the liver. Cori puts it thus: "The processes of sugar disposal that are accelerated in the body by insulin are those mainly in the peripheral tissues and involve both glycogen formation

TABLE IX.—*Disposal in the Body of Absorbed Sugars.*

—	*Without Insulin.*				*With Insulin.*			
	Oxidised.	Deposited in—		Total disposed of.	Oxidised.	Deposited in—		Total disposed of.
		Liver.	Muscles.			Liver.	Muscles.	
	Per cent.				Per cent.			
Glucose	44	18	25	87	49	6	36	91
Fructose	36	38	12	86	59	6	27	92
Dihydroxyacetone	51	21	15	87	53	2	33	88

* Part I. appeared last week.

† In later experiments the percentage recovered was somewhat higher in the insulin-treated animals.

‡ The dose of insulin was 15 units per 100 g. of rat.

and sugar oxidation." In so far as glucose is concerned, the conclusion drawn in the earlier papers, that insulin increases the amount oxidised, is therefore contradicted in this one.

In the light of these later results the fall in systemic blood-sugar following insulin injections is explained as due to increased utilisation in the muscles, by either glycogen formation or oxidation, running ahead of glycogen formation in the liver. But inasmuch as the gain in the one place practically balanced the loss in the other with glucose and dihydroxyacetone, it is difficult to see why any fall should occur in blood-sugar, unless we consider the lesser deposition of glycogen in the liver to be dependent upon inhibition of a process of gluconeogenesis. According to this view, the sugar which is certainly produced by gluconeogenesis in the liver during fasting will be suddenly cut off when insulin is injected, and the sugar absorbed from the intestine, which under normal conditions would be retained by the liver, is dealt with by the muscles, the blood-sugar falling because there is now no new sugar being produced by the liver. This view regarding the part played by changes in gluconeogenesis has been championed by Best, Dale, Hoet, and Marks, and was originally suggested in a general way by Laufberger.

In the last paper published by Cori and Cori [42] the effect of insulin was studied in the post-absorptive state, that is, after sugar absorption has been proceeding for four hours and the glycogen stores of the liver are being used up. The conclusion is drawn that insulin is a hormone that leads to a preferential utilisation of blood-sugar and, indirectly, of liver glycogen. The method used for calculating the amount of glycogen in liver and muscles at the beginning of the post-absorptive period is explained later on. The curious result is recorded in this paper that, whereas in uninjected rats 7·5 per cent. more carbohydrate disappeared than could be accounted for by oxidation, in animals injected with insulin 13·4 per cent. more was oxidised than could be accounted for. This result is given as final evidence that no unknown intermediary of carbohydrate metabolism can be formed in excess as a result of insulin, for, it is pointed out, if such were the case then the results should have gone in the opposite direction. But they prove too much. Indeed, so far as I can see, the results only show that comparisons between glycogen utilisation and carbohydrate combustion are not of sufficient accuracy to enable us to say whether or not some body, as yet unrecognised, is formed at some stage during the action of insulin.

Notwithstanding these criticisms, I should like to take this opportunity to express my admiration for the work of the Buffalo investigators. It may not have accomplished all that its authors had hoped for, but it has opened up new methods of approach and has demonstrated what many students of carbohydrate physiology have long suspected, that the rapid changes in glycogen content in the liver and the muscles are closely related.

Comparison of Different Views.

We may sum up the conclusions of these different groups of workers by saying that Lesser and the Cori's ascribe the entire effect of insulin to an increase in glycogen formation and carbohydrate combustion, whereas Best, Dale, &c., while considering that this explains the increased sugar loss in eviscerated animals, believe that in intact ones there comes into play another factor, which consists in an inhibition of gluconeogenesis in the liver. They point out that excessive gluconeogenesis and defective glycogen formation in the liver are the striking fundamental defects in diabetes and that insulin immediately rectifies these defects, its action on normal animals being merely an intensification of that on diabetic ones. This will therefore account for the raised R.Q., the subsequent depressed oxidation, the fall of temperature, and the depletion of glycogen, which are known to occur after very large doses of insulin, especially in small animals.

It is not easy, however, to harmonise all of the results of these researches, and this is particularly the case when we compare those of Best, Dale, &c., and the Cori's. When insulin was given, the former found that several grammes of glucose were utilised in the spinal preparation over and above the amount used without it, whereas the latter found in the white rat practically the same balances. Since some of the extra sugar which disappeared in the eviscerated spinal preparation was accounted for as coming from the liver, and since a shift of glycogen from liver to muscles occurred in the rats, this difference in results is partly accounted for, but by no means completely so.

Production of Unknown Sugar Derivative Increased by Insulin?

Although the suggestion which I offered in 1923 to account for the immediate disappearance of glucose from the blood which follows the injection of insulin—namely, that some unknown carbohydrate derivative is formed in considerable amount—has not therefore been sustained, either by experiments in which there is a much closer approach to quantitative accuracy than in those upon which I based the suggestion, or by direct chemical examination of the tissues, I am nevertheless disinclined to dismiss altogether the possibility that such a substance exists. It may not accumulate in sufficient amount to figure appreciably in the final balance between glucose disappearance and glucose utilisation, but it may be produced at an early stage of insulin action and then rapidly be transformed partly into glycogen and partly into some substance which is oxidised. That an unknown body related to carbohydrate must exist in mammalian muscle is suggested by the experiments of Fraser and myself, referred to in the first lecture, and it is possible that the substance which appears between glycogen and lactic acid when frozen muscle is pulverised and allowed to thaw is related to it. This intermediary substance may be of the nature of a trisaccharide having a lower reducing power than glucose and destructible by 30 per cent. potash. It is conceivable that such a substance may be responsible for the sugar which is excreted by depancreatised animals over and above that which can be accounted for as coming from the known carbohydrate reserves and from protein, and if such should prove to be the case, then it would be unnecessary to suppose that fatty acid is a source of sugar in diabetes. It is significant in this connexion that the unaccountable extra sugar excretion in diabetes occurs at early stages after the removal of insulin.

Respiratory Experiments on Rabbits.

As my reasons for still clinging to what may be called a remnant of my original hypothesis I have, so far, only shown why I do not consider it disproved by the results of others, and now I would like to dwell for a few moments on those of two researches done in my own laboratory which offer further reasons for my position. I will refer first of all to observations by Chaikoff and myself [43] concerning the effect of insulin on the respiratory exchange of rabbits, either while the animals were metabolising practically nothing but carbohydrate, or were deprived of this foodstuff. The former condition was provided for by feeding during several days with abundance of carrots and oats. The animal was then placed in a respiratory cabinet of the Benedict type, along with food, and the oxygen consumption and R.Q. measured from hour to hour during a period of six hours. Next day these observations were repeated with the difference that prior to placing the animal in the cabinet, it was injected with a sufficient dose of insulin to cause the blood-sugar to become decidedly decreased without, however, reaching the level at which hypoglycæmic symptoms supervene. Under these feeding conditions the R.Q. was found to stand practically at unity, indicating according to accepted doctrines that carbohydrate was alone being oxidised. Evidently the protein metabolism that must have been going on at the time was insufficient to affect the quotient

measurably. Considering that the animals moved about to a varying extent while in the cabinet, the oxygen consumption was very steady from hour to hour, especially if we discount the first hour when a small error in measurement may have been involved.

It can be seen from the table of results that insulin had practically no effect either on the R.Q. or on the average oxygen consumption during the six hours. In some of the experiments (Table X.) it would appear

TABLE X.—*Comparison of O_2 Consumption and R.Q. in Rabbits With and Without Insulin.*

—	c.cm. O^2 per hr.	R.Q.	Total calories. (In 6 hrs. per kg.)	Total carbohydrate. (In 6 hrs. per kg.)	Difference.
			Feeding.		
1. Normal..	615	1·03	18·6	4·97 g.	
Insulin ..	577	1·04	17·45	4·67 g.	−0·31 g.
2. Normal..	560	1·01	16·98	4·54 g.	
Insulin ..	603	1·01	19·06	5·10 g.	+0·56 g.
3. Normal..	723	1·02	21·90	5·86 g.	
Insulin ..	764	0·99	23·14	5·87 g.	+0·01 g.
			Fasting.		
1. Normal..	541	0·76	15·42	0·76 g.	
Insulin ..	607	0·77	17·39	1·09 g.	+0·33 g.
2. Normal..	535	0·72	15·12	0·16 g.	
Insulin ..	558	0·74	15·90	0·49 g.	+0·33 g.
3. Normal..	720	0·72	16·90	0·22 g.	
Insulin ..	657	0·78	15·77	1·06 g.	+0·84 g.

that more carbohydrate was used on the insulin day, but the reverse is the case in others. These results were interpreted as showing that neither an increase in the combustion of carbohydrate nor an inhibition in gluconeogenesis could have occurred as a result of injecting insulin, leaving therefore increased glycogen deposition in the muscles as the only known process by which the sugar which disappeared could be accounted for. But this did not seem likely considering that the muscles were presumably already fully charged with glycogen. I have to confess, however, that these results are not so convincing as Chaikoff and I thought them to be at the time they were obtained. As Cori and Cori have pointed out, we did not know how much sugar actually disappeared and it may be that all which has to be accounted for is that represented by the fall in the blood and tissue-sugar percentages. During the first hour the blood-sugar percentage was reduced by about 0·070, and if we take the volume of the blood as 70 c.cm. per kg. and that of the tissue fluids as the same, then about 0·100 less sugar was present, an amount which would have caused an increase of 75 c.cm. in oxygen consumption if all of it had been burned. Now, if instead of taking the averages of the O_2 consumption over the whole period of observation, we compare the consumption hour by hour for each animal (*vide* original paper), then, with the exception of one out of five experiments, the increase during the first two hours in the insulin-injected rabbits is almost adequate to account for the disappearing sugar.

In rabbits which were observed in the fasting condition, the results for O_2 consumption as well as R.Q., both when regarded as averages for the entire period of observation and when compared from hour to hour, show an undoubted increased carbohydrate combustion after insulin, and it is possible that the less evident effects observed in carbohydrate-fed animals is dependent on the principle that the glucose equivalent of insulin becomes very low in the presence of excess of carbohydrate.

Insulin and Glycogen Formation in Rats.

The other research has to do with the influence of insulin on glycogen formation. We have seen that it has definitely been shown by Best, Hoet, and Marks that glycogen is deposited in the muscles of eviscerated preparations when excess of insulin and of glucose is present in the blood, and the question arises, whether any of the sugar which disappears when smaller doses of insulin are given is to be accounted for in this way. To test this possibility, Barbour, Chaikoff, Macleod, and Orr [10] used the standard white rat in which, as Karczag, Macleod, and Orr had previously shown, the percentages of glycogen in liver and muscles are predictable within narrow limits. The results for previously fasted rats show definitely that insulin does not at first cause glycogen to be deposited; indeed, on the contrary, it causes the glycogen to become less both in the liver and the muscles. Since this result, in exaggerated form, is that which is obtained when sufficient insulin is injected to bring on severe symptoms of hypoglycæmia, it may be supposed that it was owing to the onset of these that the glycogen disappeared. All I can say is that no evidence of these symptoms could be obtained by the closest scrutiny of the animals, nor did the blood-sugar fall to the level at which they are observed to occur. The results of these experiments were shown in the chart of Fig. 2 and from them another interesting fact comes to light—namely, that the glycogen percentage rises in the liver at a later stage of insulin action, before there is any return of blood-sugar and while the percentage in the muscles is still falling. This is particularly marked when the dose of insulin is relatively small and is in confirmation of work by Frank, Hartmann, and Nothmann on fasted rabbits.[44] It indicates that although excess of insulin in the normal organism always causes already existing glycogen to disappear from the liver and, as we shall see immediately, always retards its deposition while carbohydrate is being absorbed from the alimentary canal, doses which are insufficient to lower seriously the blood-sugar have the ultimate effect of encouraging the deposition of glycogen formed by gluconeogenesis in the liver. This effect is a pronounced one in diabetes in which gluconeogenesis is very active.

It is certainly safe to conclude that excess of insulin in the blood of fasting animals does not cause any of the sugar which immediately disappears from it to be deposited as glycogen, either in the muscles or in the liver,

Turning now to rats given insulin while maximal absorption of carbohydrate was proceeding (as the result of feeding previously fasted animals with all the starchy food they would take), we found that deposition of glycogen in the liver was invariably retarded and that extra glycogen was deposited in the muscles only when the dose of insulin was a very large one, or when the injection of smaller doses was repeated (Fig. 5). But even when this extra glycogen formation occurs in the muscle, it cannot probably be held responsible for any large part of the sugar which disappears, since the amount which fails to be deposited in the liver corresponds closely to the excess formed in the muscles. No evidence can be found in these results, which are sufficiently numerous to rule out errors of observation, to show that increased formation of glycogen in the muscles comes into play as a factor causing reduction of the blood-sugar when insulin is injected in moderate amounts. When the dose of insulin was very excessive during absorption of food more glycogen was deposited in the muscles, but, since there was a corresponding deficit deposited in the liver, all that this indicates is that insulin in large excess may cause a shift in the distribution of glycogen in the body. It is interesting, as Cori has proved, that excess of epinephrine causes a shift in glycogen distribution in the opposite direction—namely, from the muscles to the liver.

Present Status of Problem of Insulin Action.

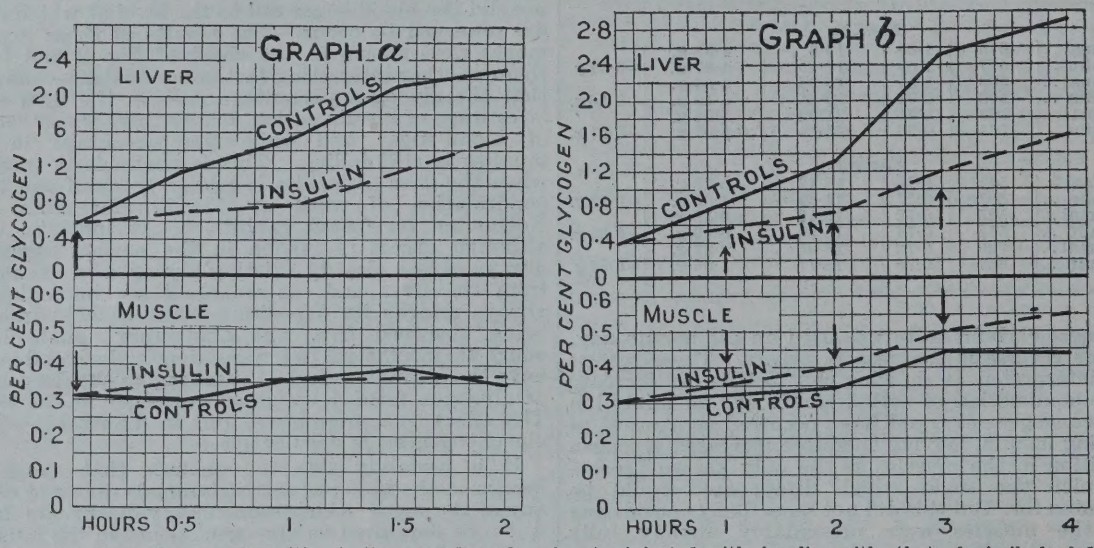
We shall return to these experiments on epinephrine shortly, but meanwhile let me sum up the foregoing evidence with regard to the action of insulin. Taking all the effects which it produces, in diabetic as well as normal animals, we find that there is no known stage in carbohydrate metabolism, up to that in which lactic acid is formed out of muscle glycogen, that this

hormone does not affect. It inhibits gluconeogenesis and stimulates glycogen formation in the liver of diabetic animals, whereas it retards glycogen formation in this organ in normal ones, except as a late effect when the animal is fasting. It reduces muscle glycogen when given in any dosage to fasting animals—and there is no basis for saying that this is because of the onset of hypoglycæmic symptoms—and has no effect on it when carbohydrate is being absorbed unless when an excessive dose is given. Under all conditions, both in normal and diabetic animals, it causes more carbohydrate to be oxidised, this being most marked in diabetic animals but so slight as to be almost imperceptible in normal ones in which gluconeogenesis when no excess of absorbed glucose is present and in increased glycogen formation in the muscles when this is the case.

EPINEPHRINE.

It has in general been assumed that the hyperglycæmia which quickly supervenes upon the subcutaneous injection of epinephrine depends on a rapid glycogenolysis in the liver. A close scrutiny of the experimental evidence offers only feeble support for this assumption. Indeed, the majority of the experiments upon which it is based have obviously been imperfect in essential details, either in the methods used for determination of the glycogen

FIG. 5.



Comparison of glycogen deposition in liver and muscles of rats injected with insulin with that of similarly fed control rats. One subconvulsive dose was injected at the beginning of Graph *a*, and several doses were injected in Graph *b*, as indicated by arrows. (Modified from Amer. Jour. Physiol.)

absorption of carbohydrate from the alimentary canal is proceeding. The net effect of all these changes is to lower the percentage of sugar in the blood, notwithstanding that some of them, such as retarded glycogen formation in the liver, would rather tend to raise it.

It seems to me, therefore, that these changes, which may or may not follow the administration of insulin, are secondary to some other fundamental change, and since it is impossible to demonstrate any influence of insulin on the sugar of the blood in vitro, either in the presence or absence of tissue extracts, we must assume that this hormone acts on some process that is dependent upon the structural integrity of the cells. Insulin must stimulate this process and lead, on the one hand, to a lowering of the tension of glucose in the cell—a glucatonia—so that sugar is removed from the blood, and on the other hand, to accumulation of some intermediary substance which, perhaps in association with phosphate—since this decreases in the blood as markedly as sugar after insulin—is then either oxidised or polymerised to glycogen.

I need not here refer to the several attempts which have been made to show that the fundamental change which insulin causes is a sensitisation of glucose, dependent on some rearrangement in the internal structure of the molecule. This may be so, but it has not been demonstrated, and so stands in much the same position as the hypothesis that some intermediary substance is formed. The possibility exists that one, or other or both of these hypotheses will be sustained by further researches, but at present all we know are the end-results of insulin, which consist in more rapid oxidation and lessened or in the provision of controls. Whereas it is the case that the hyperglycæmia is sometimes of slight degree when epinephrine is injected into rabbits from which the glycogen content of the liver has been reduced to the lowest possible level, by fasting and strychnine, yet it is also well established, as was first shown by Pollak, that glycogen reaccumulates in the liver when the injections are repeated under these conditions. Pollak's results[15] were confirmed by Kuriyama[12] and, more recently, by Markowitz,[16] who used most drastic methods to rid the liver of glycogen before injecting the epinephrine. The injections were then repeated several times a day for periods varying from five to nine days and it was found that the blood-sugar was raised by the injection as greatly towards the end of the period as at the beginning, and that the liver, the muscles, and the heart still contained fairly large amounts of glycogen when the animals were finally killed. Thus, in a typical experiment in which the injections had been kept up for nine days following upon four days of fasting, a total of about 1 g. (1·05 per cent.) of glycogen was found in the liver and, taking the muscles as 40 per cent. of the body-weight (approximately 2 kg.), over 2 g. (0·265 per cent.) in the muscles, giving a total of between 3 and 4 g. of carbohydrate in the entire animal. Assuming that these amounts of glycogen were present throughout the experiment and that the immediate fuel for muscle is its glycogen, then it is obvious that gluconeogenesis must have been going on on a scale which was so large as to make it certain that fat as well as protein was being used for it. But the problem of the materials used in gluconeogenesis is not under discussion in these lectures.

The Cause of the Hyperglycæmia.

There are two possible causes for the increase in blood-sugar: a more rapid breakdown of the performed glycogen in the liver, or a decrease in the rate at which sugar is leaving the blood for the tissues. A third alternative—namely, that some of the increase depends on conversion of the glycogen of the muscles into sugar—is definitely ruled out. Thus Mann and Magath[20] and, more recently, Soskin,[45] have shown that no effect is produced on the blood-sugar level by injecting epinephrine into animals deprived of the liver. In this latter condition alone, the blood-sugar steadily falls and it continues to do so without any temporary delay following the injection of epinephrine. This, and other evidence, which I have referred to in another place, shows clearly that once sugar has passed from the blood into the muscles to form glycogen, it cannot be directly returned to the blood as sugar, by a reversal of the process. But this irreversibility does not necessarily mean that epinephrine is without influence on the glycogen present in the muscles. It might stimulate its natural breakdown into lactic acid which could then be transported by the blood to the liver to be reformed into glycogen there. As a matter of fact, Choi[21] found, by comparison of corresponding muscles of the two legs of the spinal cat, that continuous injection of epinephrine (intravenously) often caused the glycogen to be diminished, but he also noted that this only occurred when the preparation became hypersensitive, and fibrillary twitching was evident in the muscles. Some of the preparations were eviscerated and in these the blood-sugar was not affected by the injections, but it rose in those in which there was no evisceration. The general conclusion was drawn that injections of epinephrine do not deplete the muscles of glycogen unless fibrillation occurs, but it has not been sustained by the results of more recent experiments performed by Cori and Cori on white rats.

Experiments on Fasting Rats.

According to Cori and Cori [46] decreased utilisation of sugar by the muscles, and not increased hepatic glycogenolysis is responsible for the hyperglycæmia caused by epinephrine. On account of the originality and ingenuity of these experiments, we will consider them in some detail. The procedure was along the same lines as in the experiments on insulin, and the first series was on rats which had been deprived of food for 21 hours. The respiratory metabolism was then measured for three hours, when epinephrine (0·02 mg. per 100 g. body-weight) was injected subcutaneously and the respiratory measurements continued for a further period of three hours, after which the animals were killed and the glycogen determined separately in the liver and the remainder of the body. The R.Q. was the same following epinephrine as during the fore-period, but the consumption of O_2 rose by 17·3 per cent., indicating that the so-called calorigenic action of epinephrine does not necessarily involve carbohydrate combustion. This confirms previous work in my laboratory by Soskin.[47] The glycogen of the liver rose from an average of 6 mg. per 100 g. of rat to 42 mg., whereas that of the remainder of the body fell from 128 mg. to 71 mg. In other words, the glycogen of the liver increased by 36 mg. and that of the rest of the body decreased by 57 mg. The authors conclude that epinephrine causes a shift of glycogen from the muscles to the liver, and, since it is now an established fact that the latter cannot be directly returned to the blood as sugar, they have advanced the hypothesis that the glycogen must leave the muscles as lactic acid which is then re-converted into glycogen in the liver. To justify this hypothesis, it was necessary to show, first, that lactate is converted into glycogen in the liver and, secondly, that excess of lactic acid appears in the blood following the injection of epinephrine. The authors state that they have been able to fulfil both of these requirements. With regard to the former, it is true that Abramson, Eggleton, and Eggleton,[48] had failed to detect any increase in liver glycogen when *r*-sodium lactate, in quantities similar to those which would be produced by severe muscular exercise, was injected intravenously into dogs under amytal anæsthesia, but Cori and Cori state that this occurs when either the racemic or the dextrorotatory acid, or their salts, is fed to 24-hour starving rats. With regard to the second requirement, they had previously demonstrated a marked increase in the lactic acid of the blood in rabbits and cats following epinephrine,[49] but it may be remarked that no evidence is given that this may not have been due to anoxæmia or to shock.

Experiments on Rats in the Post-absorptive State.

Cori and Cori are careful to point out that although the circumstantial evidence strongly favours the view that the extra glycogen which appears in the liver in these experiments on fasting rats comes from that meanwhile disappearing from the muscles, it is also possible that a more active process of gluconeogenesis occurring in the liver might be the cause. They consider that this possibility is ruled out by the results of a second series of observations,[42] in which they injected epinephrine into rats in the post-absorptive state—that is, during the period following upon absorption of carbohydrate from the alimentary canal. The glycogen disappearance from the liver which would be occurring under these conditions was found to be changed by epinephrine injections into glycogen accumulation, accompanied by loss of glycogen from the muscles. On the assumption, which is probably justified, that gluconeogenesis will be latent when glycogenolysis is active, they conclude that alteration in the speed of the former process can play no rôle in accounting for the increased deposition of glycogen.

The procedure followed in these experiments is ingenious.

Rats previously starved for 24 hours were fed by stomach-tube with 1·065 g. glucose per 100 g. of rat, which is the amount which would be absorbed in four hours.[41] During this period, measurement of the respiratory exchange showed how much carbohydrate was being oxidised and knowing, from previous experiments (1) that 86·5 per cent. of the absorbed glucose could be accounted for; (2) the proportion between the glycogen of the liver and muscles; and (3) how much glycogen is present both in the liver and in the muscles of 24-hour starved rats, it was possible, after making allowance for protein metabolism, to compute the amounts which must have been present in these places after absorption was complete. The injections were then made and the respiratory measurements continued for three hours when the animals were killed and the glycogen determined.

In four rats, in which saline was injected instead of epinephrine, an average of 220 mg. glycogen per 100 g. of rat was calculated to be present in the liver and 432 mg. in the rest of the body at the time of injection and these values were found (by analysis) to be 0·171 and 0·264 mg. three hours after it showing, therefore, decreases of 49 mg. and 168 mg. respectively. When epinephrine was injected in four other rats, glycogen increased in the liver to the extent of 26 mg. but decreased in the muscles to the extent of 298 mg. It may here be noted, however, that the values recorded for individual rats are very divergent; for example, in the control group the calculated values for the liver glycogen per 100 g. of rat, prior to injection, varied between 190 and 254 mg. and in the epinephrine group, between 178 and 257 mg., and at the end of the post-absorptive period in the controls the extrahepatic glycogen ranged from 215 mg. to 345 mg. and in the epinephrine group from 113 mg. to 139 mg. Surely it is somewhat risky to average figures that are so divergent when there are only four or five individual observations in each group. And when these loose averages are used, as the authors have used them, for balancing the carbohydrate which disappeared from the body (changes in glycogen and blood-sugar) with the carbohydrate which was

oxidised (determined from the respiratory exchange), too much weight cannot be given to all the conclusions drawn from them. But, inasmuch as comparisons of individual observations in the different groups always show more glycogen in the liver and less glycogen in the muscles after epinephrine, it is no doubt justifiable to draw the general conclusion, that epinephrine in the dosage given reduces glycogen in the muscles and increases it in the liver. One would like to know, however, in view of Choi's results on the spinal cat, whether the muscles were hyperexcitable or were fibrillating.

It is next shown that there is an increased expenditure of energy (from 0·76 to 0·86 calories per hour) in rats injected with epinephrine in the post-absorptive state, two-thirds of the extra calories being furnished by fat combustion, and a third by carbohydrate. In the starving rats of the previous research all of the extra energy set free by epinephrine was found to come from fat, and since there was no oxidation of carbohydrates there was no depletion of the glycogen stores. In the starving condition there is merely a shifting of glycogen from muscles to liver, and the authors account for the practical constancy in glycogen between the twenty-fourth and the forty-eighth hours of starvation alone as due to a similar carbohydrate cycle.

Does Epinephrine Stimulate Gluconeogenesis?

These facts appear to the authors to make unnecessary the assumption that gluconeogenesis occurs as a process to maintain the glycogen stores, either during fasting or after epinephrine injections. They would have us believe that glycogen is a substance of no metabolic importance but which can be shifted about from muscles to liver according to the amount of epinephrine present in the blood. But it is difficult to harmonise such a revolutionary view with the known facts. Thus, it would mean that the 3 or 4 g. of carbohydrate (glycogen) which we have seen to be present in the body of a fasting rabbit which has been injected repeatedly with epinephrine for nearly two weeks is only some of that which was originally present, after having been shifted about between the muscles and the liver. The blood-sugar is merely the form as which the glycogen is shifted from liver to muscles and the blood lactic acid that as which it completes the cycle. No carbohydrate combustion therefore goes on under these conditions, so that no process of gluconeogenesis is necessary. The bearing of this conception on that of the chemistry of muscular contraction is not discussed, but it seems to me impossible to reconcile the two, unless we are to assume that all of the glycogen which is broken down during muscular contraction is carried as lactic acid to the liver and is there reconverted, through glycogen, into blood-sugar. In another paper the authors suggest the possibility, already made by me, that a process of conversion of fat and protein into carbohydrate may go on in the muscles, but in the present paper they point to the low R.Q. which is observed during fasting, as well as its failure to rise, in this condition, after epinephrine, as evidence that *no* carbohydrate is being oxidised.

It is very difficult to understand from the paper what the authors consider to be the physiological function of the shift of glycogen.

Another difficulty arises in explaining why it is that epinephrine always causes hyperglycæmia. One fact stands out prominently—namely, that increased glycogenolysis in the liver cannot account for it, even when there is a lot of glycogen in this organ. Thus, a hyperglycæmia amounting to 0·174 per cent. in three hours in rats following epinephrine injection would, as judged from sugar injection experiments, require the mobilisation of 750 mg. of liver glycogen (or an initial glycogen content of 20 per cent.), which is impossible. The authors think, however, that some mobilisation of liver glycogen may occur but is masked by the glycogenesis from the blood lactic acid, so that the glycogen percentage increases.

"Decreased utilisation of blood-sugar is one of the principal causes for epinephrine hyperglycæmia under post-absorptive conditions." Even although hepatic glycogenolysis is only proceeding at its normal rate, the blood-sugar will then rise. This decreased utilisation of blood-sugar does not mean decreased carbohydrate combustion, indeed, on the contrary, epinephrine increases oxidation of muscle glycogen and decreases blood-sugar utilisation.

Comparative Effects of Insulin and Epinephrine.

A very interesting comparison is made in this research of the effects of insulin and epinephrine on the behaviour of glycogen in the liver and muscles, and of the relative combustion of carbohydrate and fat, as calculated from the respiratory exchange. The following table gives a brief tabulation of the differences.

Glycogen Disappeared.

—	Total.	Per cent. derived from—		Calories and CHO oxidation compared with controls.	
		Liver.	Muscles.	Calories.	CHO.
	mg.				
Controls ..	216	23	77	—	—
Epinephrine	298	Increased	All	+24%	+19·5%
Insulin ..	329	43	57	Same	+97·3%

Insulin therefore causes an equicaloric replacement of carbohydrate oxidation for fat oxidation. It "leads to a preferential utilisation of blood-sugar and indirectly of liver glycogen," whereas epinephrine increases the oxidation of both types of oxidation but diminishes the utilisation of blood-sugar and mobilises the muscle glycogen.

Experiments on Rats During Sugar Absorption.

The influence of epinephrine in the utilisation of blood-sugar was further studied in rats while absorbing glucose (third paper),[50] an advantage here, over observations made during the post-absorptive stage, being that carbohydrate metabolism is carried on mainly at the expense of the sugar that is circulating in the blood. The same dose of epinephrine, as used in the other experiments, now caused glycosuria which persisted throughout the observations, practically the same quantities of sugar being excreted during each of the four hours, although the blood-sugar steadily declined after the first hour, when it was at its highest. The rate of absorption of glucose was the same as that previously found in normal rats during the first hour following the injection, but it fell off later. Notwithstanding this slower absorption, more glycogen was deposited in the liver than in control observations, except during the first hour when the amounts were equal. This raises the question as to the cause of the glycosuria. Since it cannot depend on less sugar being retained by the liver, interference with the processes of sugar disposal in the tissues must be responsible. (The rapidity of these processes in a rat is called attention to; thus in a rat of 100 g. there are 7 mg. of glucose in the blood (blood-sugar 0·1 per cent.) and 1065 mg. are absorbed in four hours. If the blood-sugar rose to 0·158 per cent. only 28 mg. is accounted for in the blood.) By computation from the glycogen analyses and the respiratory metabolism, it was found that for every 100 parts of glucose absorbed, 10 parts less body glycogen were deposited and 5 parts less oxidised than in control rats. Of these 15 parts which failed to be utilised, 5 parts were stored in the liver as glycogen, 6 parts were excreted in the urine, and 3 parts retained in the body fluids.

It is stated that "after epinephrine injections, carbohydrate oxidation is carried on mainly at the

expense of muscle glycogen" but, at the same time it is supposed that the utilisation of blood-sugar (and therefore of liver glycogen whence it comes) is diminished and so causes hyperglycæmia. It is very difficult to reconcile these facts, and the authors finally surmount the difficulty by concluding that "epinephrine has not a direct accelerating influence on carbohydrate oxidation. It merely mobilises muscle glycogen and it depends on the metabolic state of the animal (presumably on the insulin content of the tissues) to what extent the glycogen mobilised in the muscles is being oxidised."

BIBLIOGRAPHY.

31. Chaikoff, I. L., and Macleod: Quart. Jour. Exp. Physiol., 1929, xix., No. 3.
32. Starling, E. H., and Evans, C. L.: Jour. Physiol., 1914, xlix., 67.
33. Macleod: The Fuel of Life, Princeton, 1928.
34. Cori, C. F., and Cori, G. T.: Jour. Biol. Chem., 1928, lxxix., 309.
35. Burn, J. H., and Marks, H. P.: Jour. Physiol., 1926, lxi., 497
36. Laufberger, W.: Zeit. f. d. ges. Exp. Med., 1924, xlii., 570.
37. Hynd, A.: Proc. Roy. Soc., B., 1927, ci., 244.
38. Lesser, E. J.: Biochem. Zeit., 1924, cliii., 39; Verhand. d. Deut. Pharmak. Gesell., 1927, p. 24; Biochem. Zeit., 1926, clxviii., 398.
39. Best, C. H., Dale, H. H., Hoet, J. P., and Marks, J. P.: Proc. Roy. Soc., B., 1926, c., 55.
40. Cori, C. F., and Cori, G. T.: Jour. Biol. Chem., 1926, lxx., 557; 1927, lxxii., 597.
41. Same authors: Ibid., 1928, lxxvi., 755.
42. Same authors: Ibid., 1928, lxxix., 321.
43. Chaikoff and Macleod: Ibid., 1927, lxxiii., 725.
44. Frank, E., Hartmann, E., and Nothmann, M.: Klin. Wooh., 1925, iv., 1067.
45. Soskin, S.: Amer. Jour. Physiol., 1927, lxxxi., 382.
46. Cori, C. F., and Cori, G. T.: Jour. Biol. Chem., 1928, lxxix., 309.
47. Soskin: Amer. Jour. Physiol., 1927, lxxxiii., 162.
48. Abramson, H. A., Eggleton, M. G., and Eggleton, P.: Jour. Biol. Chem., 1927, lxxv., 763.
49. Cori, C. F., and Cori, G. T.: Ibid., 1925, lxiii., 253.
50. Same authors: Ibid. 1928. lxxix., 343.

GRAVES'S DISEASE AND THYROIDECTOMY.

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IN March, 1922, I published in THE LANCET the results of a consecutive series of 250 operations for exophthalmic goitre. At that time the surgical treatment of Graves's disease was not as firmly established as it is at present, or perhaps it would be more accurate to say that it was only just beginning to become firmly established. It had been practised to a certain extent before this period, but it is only really since about 1915 that its mortality has been so considerably reduced that it can be confidently recommended to severe sufferers from the disease. Since that date I have operated on another 500 cases of which a fairly complete record has been kept, and the present seems a not unsuitable occasion to inquire into the results.

Definition.

In all scientific or semi-scientific discussions it is as well at the commencement to endeavour to be quite sure what we are talking about, for it is obvious to all that between the fully developed case of Graves's disease, with all the symptoms well marked and extreme toxicity present, and the simple parenchymatous or adenomatous goitre, an infinity of different variations is seen, depending on which symptoms are or are not present, on whether the greatest effect of the disease falls upon the cardiac, nervous, or alimentary systems, and upon how marked the general toxicity is. We must therefore have a definition of Graves's disease upon which we can work and to which we can adhere; the simpler this definition is the better. I am, therefore, accustomed to apply this term only to those cases where in addition to the signs and symptoms so well known to represent thyroid toxæmia—i.e., palpitation, rapidity of pulse, nervousness, excitability, tremor, shortness of breath, sleeplessness, damp warm skin, &c.—there are also definite enlargement of the heart and definite changes in the eyes. This definition will be seen to rule out the simple forms of toxic adenomata, and adenomatous or parenchymatous goitre in nervous women. Naturally, the microscopic examination of a section of the thyroid gland is of the greatest use and importance. In the majority of cases where eye signs and cardiac enlargement are present the pathologist's report is that the thyroid gland shows the changes characteristic of Graves's disease. This is not, however, invariably the case, and even if the microscopic section resembles a simple parenchymatous or adenomatous goitre, if the above clinical changes are present, I think the case is deserving of the title of Graves's disease. One not infrequently sees patients in whom all the above clinical symptoms are well marked, the exophthalmos often being particularly noticeable, in whom little or no enlargement of the thyroid is present. Nevertheless, they should come within the scope of our definition, though as a matter of fact they are not necessarily cases which are particularly suitable for operation.

This definition does not, of course, rule out the so-called secondary Graves's disease, for the distinction between secondary and primary Graves's disease is one of considerable importance in use. Primary Graves's disease denotes those cases where the first appearance of the goitre and of the toxic syndrome roughly coincide, or at any rate where the goitre does not appear long before the symptoms. Secondary Graves's disease is the term applied to the quite common class of case where a parenchymatous goitre or more commonly an adenoma has been present and free from toxic symptoms for a long time, often many years, and it is not until after a long interval that the toxic symptoms appear. The former class of case, the primary ones, are usually the most severe and intractable, and it is in these that the tendency of the disease is specially to pick out the nervous system. In the secondary cases the disease is less severe and even more amenable to surgical treatment than in the former class. There is also a marked tendency in these latter cases for auricular fibrillation to set in sooner or later. Even when this occurs it is no bar to surgical treatment for, as will be seen later, such cases with fibrillating hearts are frequently amongst the most successful results obtained after thyroidectomy.

Operative Technique.

Of the last 500 consecutive operation cases ten have died as the result of the operation, giving a mortality of 2 per cent. One hundred and five of them were hospital cases, of which 95 were females, of whom four died, and ten were males, of whom none died. Three hundred and ninety-five were private cases, of whom 375 were females, five dying, and 20 were males, one dying. The hospital mortality thus is 3·8 per cent., the private mortality 1·5 per cent. The mortality among females also seems to be considerably higher than that among males. I do not think we need lay a stress on this differentiation in mortalities except to point out that the larger number of bad cases occur among women and that possibly the private patients in many cases have better and more prolonged treatment before operation.

I do not wish to dwell in detail on points in the operative technique, though there are certain general principles which cannot be too often or too strongly insisted upon. Of the many operations which have been devised and practised the removal of large portions of thyroid tissue seems to be the only one

that is likely to survive permanently, ligature of thyroid vessels being of very little practical use. In the cases which are so bad that it is the only thing which can be attempted, ligature is not likely to do much good, whereas in the milder cases it is certainly not the best thing that can be done. The amount of thyroid tissue that should be removed is very important. It is practically never sufficient to remove one lobe and the isthmus; though this will create an improvement it is not the least likely to be curative. A portion—varying in amount—of the other lobe should always be removed as well. It should also be remembered that just as in such conditions as myxœdema it is not possible to specify straight away exactly what the proper dose of thyroid required will be, and different doses may have to be tried until the right one is found, so in removing thyroid tissue it may be very difficult to settle how much should be removed at the operation; the surgeon must therefore be prepared occasionally to find that he has not removed sufficient and that a further portion may have to be removed subsequently. This is naturally a thing to be avoided if possible. The danger of causing myxœdema is apparently very small, for estimations of the basal metabolic reactions in many of these cases before and after operation have shown that it is very uncommon to find it reduced below normal after thyroidectomy. It looks as though the smallest amount of toxic thyroid tissue is enough to keep the normal metabolism of the body going. One's aim, therefore, should really be to remove as much thyroid tissue as possible, stopping short, of course, of a complete thyroidectomy, but the limit is naturally set, and in the very bad cases very rigidly set, by how severe a procedure the patient's strength is equal to.

Another point in the operation to be avoided, if possible, is the leaving in the neck of small isolated portions of thyroid tissue, in such situations as upon the recurrent laryngeal nerve or around the superior thyroid artery. Though this procedure may make the operation a little easier these isolated portions left behind are very liable to undergo hypertrophy later on, and then they may give rise to a recrudescence of symptoms.

Anæsthesia and Pre-medication.

The choice of anæsthetic is undoubtedly of the greatest importance. In the first series of cases published we made use very largely of local anæsthesia. The late Sir Hector Mackenzie was very strongly of the opinion that this was of the greatest importance, and it certainly appeared as though this was largely responsible for the small mortality. Recently, however, we have been doing more and more of these operations under open ether anæsthesia with equal safety, though in the very bad cases—i.e., those with very grossly dilated hearts and very rapid pulses—local anæsthesia is still employed. By its means no one can certainly undertake cases to which one would not venture to give a general anæsthetic. Ether given by the open method, and as little as possible of it, is what we now employ in most of these cases. Patients are kept very light throughout so that a minimum quantity is required. A dose of morphia, or in many cases a large dose of paraldehyde in the rectum (a drachm for every stone of the patient's weight), can usefully be given an hour or two before the operation. Rectal ether we have used on occasions, though it does not appear to present any particular advantages over ether given by inhalation; I do do not think intra-tracheal anæsthesia either necessary or advisable. It is not necessary, because it is very uncommon indeed to find any stridor or tracheal pressure or displacement in cases of Graves's disease, for the goitre is usually too uniform, while the disadvantages are due to the fact that it entails a very considerable depth of anæsthesia at the commencement for the passage of the catheter and also a considerable amount of manipulation of the neck.

It is only of recent years that it has been an almost invariable routine to give all patients before operation a preliminary treatment with Lugol's solution of iodine. Complete rest in bed on a full diet with Lugol's solution in doses of about 10 minims two or three times a day almost invariably results in considerable general mprovement, especially of the pulse-rate and cardiac irritability. This improvement, however, is only of short duration, rarely lasting for more than two or three weeks, but it constitutes a very valuable form of preliminary preparation for operation. A few patients are encountered who are made worse by Lugol's solution and in whom therefore it cannot be used. Some surgeons make it a practice to select the cases suitable for operation and the best time at which the operation should be done by reference to how long the patient has had the condition altogether, feeling that certain periods in the duration of the disease are more suitable for operation than others. I have never been convinced that there is any really sure ground for this, and in most of these cases we have been guided far more by the clinical condition of the patient, the basal metabolic reaction, &c., than by the actual time that the disease has been in existence. It is a fact that such patients tolerate hot weather badly, and probably very hot weather is not the best time to select for operating on them. At the same time, in London at any rate, thick foggy weather is just as unsuitable for operations, and we have not therefore as a rule laid very great stress on these weather conditions.

Selection of Cases.

There are, of course, no fixed rules that can be laid down for the selection of cases suitable for operation, but it may be remembered that in quite a number of cases the condition is so slight or early that it may well be doubted if operation is really necessary, and that, on the other hand, there are a few cases (and only a few) which are so bad that an operation cannot be advised. In almost all cases it is wise to try the effects of medical treatment first, for though this may not necessarily be curative, it is an almost necessary preliminary to operation. The only features which can definitely be said absolutely to contra-indicate operation are marked failure of the heart and myocarditis, as shown by œdema of the feet, &c., and serious mental changes of the melancholic or maniacal type. Naturally, the usual nervous and emotional instability which is one of the features of the disease is no contra-indication, nor is auricular fibrillation. As I have already said, certain cases with marked auricular fibrillation (especially cases of secondary Graves's disease) do most remarkably well, the cardiac irregularity sometimes entirely disappearing within a few days of the operation, though one would prefer that they should be done, if possible, before bad fibrillation sets in.

There are certain cases which usually do not do very well after operation and in whom, therefore, operation is rather to be avoided if possible. The first group of these are children under 15. Fortunately, the disease is distinctly rare in children, though it is occasionally seen as young as 5 or 6 years old. Here the results of operation are usually disappointing. The second group of cases are those who, although they have marked signs and symptoms of Graves's disease, have no enlargement of the thyroid, not a very uncommon class. One may well wonder what the true pathology of these cases is. Remembering that the other ductless glands, such as the pituitary, are all involved to a certain extent in this disease, it is possible that in this type of case the influence of some other gland, again possibly the pituitary, is predominant, the thyroid only playing a very secondary part. However this may be, these particular cases do not appear in practice to get as much improvement after a thyroidectomy as do the more ordinary ones.

It must be remembered that Graves's disease is not necessarily a fatal disease. It is probable that quite half the cases, if untreated or only inefficiently treated, will survive and live for a long time, though the majority of these will certainly pass into chronic invalids unable in any way to lead an ordinary life and only hanging on to life precariously, while they are liable to be carried off by any intercurrent infection. Those that get well spontaneously will probably only do so after many years of ill-health. There is little doubt that operation, though not necessarily absolutely a life-saving measure, is the quickest and most certain way of getting these patients well enough to lead a normal life, and this question of saving time and ill-health is one of the most important influences which makes an operation desirable. The earlier the operation is performed and the fitter the patient is at the time, the quicker will this result be achieved.

Results of Operation.

Patients with Graves's disease as a class, both in hospital and in private practice, appear to be very easy to keep in touch with. They take a great interest in their own condition and are always pleased to report how they are and to submit to examination if necessary.

With regard to the results, one may say in general that it is the rarest thing in the world to see a patient who has had an *adequate amount* of thyroid tissue removed who is not very greatly improved. The worse the patients are before the operation the more marked the improvement is and the more pleased they are with the results as a rule, and it is a remarkable feature that the sense of well-being and the improvement in their subjective symptoms are generally even more marked than the amelioration in their physical signs. Thus most patients six months after the operation are able to lead a normal life, sleep and eat well, put on weight (in some instances too much), and express themselves as feeling perfectly well. Nevertheless, on examining them it is not uncommon to find that their pulse may still be a trifle quick—say, in the neighbourhood of 80 to 90—and they may still be somewhat jumpy and excitable. The exophthalmos disappears less than the other features, and if marked before the operation, though it will improve, it is not likely to disappear completely. These physical signs, however, tend gradually and slowly to vanish in the course of the first year after the operation. The dilatation of the heart which nearly all these cases have also disappears. Mentally and emotionally they become more stable. It must be remembered, however, that many of them are by nature and family history excitable, emotional, and unstable, and we can hardly hope by thyroidectomy to alter their constitutional tendencies, though we can well expect to return them to the condition they were in before the Graves's disease started.

The first few months after the operation is a very important period and the patients should be under careful observation for at least six months, while it is as well to warn them before the operation is performed that they must not expect to be well for quite this period. During this time they must lead the quietest possible life, avoiding all excitement, staying in bed late in the morning, and going to bed early at night; at the end of this period they may gradually begin to lead normal lives again. Once they have recovered sufficiently to lead a normal life there need be few restrictions on what they do, though long periods of strain and anxiety should be avoided if possible. The question of child-bearing is one which often arises, and once the pulse-rate has dropped persistently to below 90 and they feel and appear well there seems to be no objection to their going through pregnancies should they so desire. Many of these patients have had two or three children since operation. The risk of myxœdema following operation does not seem to be at all great, on the whole less than after treatment with X rays.

PSITTACOSIS,

WITH AN ACCOUNT OF CASES OF HUMAN INFECTION.

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PSITTACOSIS is an epidemic disease of parrots, the chief symptoms of which are general debility, loss of appetite, and chronic enteritis. Its mortality among infected birds is very high and it is probably responsible for a large proportion of the deaths occurring among parrots soon after their arrival in Europe. This mortality forms a serious problem for bird-fanciers.

History of the Disease.

Boggs[1] states that the disease was first recognised in Germany by Ritter in 1879, but as I have been unable to consult the original paper I am not certain whether Ritter described the disease in man or only in parrots. However that may be, it was not until the years 1892–93 that psittacosis acquired serious clinical importance. At that time there occurred in Paris a large number of human cases of continued fever, one of the chief characteristics of which was pulmonary consolidation of unusual type. Accurate statistics cannot have been available but the epidemic was obviously a grave one, for contemporary physicians estimated the mortality at 45 per cent. of the patients attacked.

In view of the fact that Paris had but recently emerged from the great pandemic of 1889–90, it is not surprising to find that this new epidemic was at first regarded as an unusual manifestation of influenza, particularly as it was clear that in the great majority of cases abnormal physical signs were found in the lungs alone. According to Macaigne[2] it is to the French physician Dubief that credit is due for first directing attention to the fact that in the case of sufferers from this new and anomalous disease it was possible to trace close previous contact of the patients with sick parrots, which at that time were popular and fashionable pets in Paris. Shortly afterwards Nocard isolated a bacillus from the bone-marrow of affected parrots and established it as the cause of their disease; he also proved the toxicity of the organism for a large number of other birds and laboratory animals and showed that it could be recovered from feathers shed on to the floors of cages and that its virulence was retained for many months. An organism indistinguishable from Nocard's was first isolated from a human case by Gilbert and Fournier in 1896.

Since this Parisian epidemic of 1892 accounts have been published from time to time of similar outbreaks in different parts of Europe, particularly in Italy, Germany, and France, but I can find only one reference to the disease in the English journals and this is in the form of a short note written by Prof. Gulland[3] in 1924, which describes two typical cases of psittacosis in women, both of whom tended the same parrot. In Gulland's cases the diagnosis, though clinically certain, was not established bacteriologically and the first of the short series that follows appears to afford the only instance of the recovery of *Bacterium psittacosis* from a human case of infection in this country. In America, McClintock[4] has reported very fully a serious local epidemic beginning in a department store which undertook the sale of a consignment of parrots.

Case Records.

CASE 1.—For information on several points in connexion with this case I am much indebted to Dr. J. A. Knott of Warwick, who had charge of her throughout.

The patient, a lady of middle age, first became ill early in July, 1928. For some days she suffered from indefinite malaise, complete loss of appetite, and frequent vomiting after meals. Despite these symptoms and the fact that she discovered that her temperature was raised, she did not go to bed. On July 9th she was very restless and an irritable cough developed; on the following day she became delirious

and was unable to get up and her temperature in the evening reached 103° F. Three days later she seemed a little better and her temperature had fallen to 99°. During this period there was no vomiting or diarrhœa; the cough was more troublesome and almost incessant, but there was no expectoration. Physical examination was entirely negative.

On July 13th, when we saw her together in consultation, she was a little delirious but could be roused to answer questions sensibly. She complained of fairly severe headache and of a feeling of extreme illness. On examination some sharp crepitations were found at the apex of the left lung; in addition there was slight tenderness in the hypogastrium and the urine contained a little pus, but nothing else could be found to account for her condition. A Widal test gave a strongly positive reaction (1 in 1000 dilution paratyphoid B) and inasmuch as it was noticed that her pulse had remained slow (between 80 and 90) despite the fever, a diagnosis of typhoid infection was made.

On July 14th she was moved into a nursing home and her temperature persisted with slight fluctuations between 100° and 103° until the 23rd, when it fell by crisis to subnormal. During the whole of this period of ten days she was gravely ill with constant muttering delirium, incessant cough without expectoration, and sharp crepitant râles in the left upper lobe; she nevertheless took fluid nourishment extremely well.

At no time was the spleen palpable and never was there the slightest rash of any kind. Early on she was rather constipated and enemata were necessary, but towards the end of the febrile period there was slight diarrhœa. Pus was often present in the urine but it was known that she had had cystitis previously. On July 19th the right parotid gland became swollen and painful, and on the 23rd a small quantity of blood-stained fluid was aspirated from it and culture media were inoculated. After the critical fall in temperature convalescence was very rapid and eventually, after three months, complete; the swelling of the parotid gland disappeared in ten days.

We should probably have been content, in view of the positive Widal reaction, with the diagnosis of an unusual type of typhoid infection, had it not been for the fact that on discussing the matter with the family we were told that the patient's niece had made the remark that, "Auntie had what the parrot had had." On inquiry we found that a West African parrot which had been purchased some weeks previously had sickened subsequently and died shortly before our patient became ill. On further investigation it was found that the parrot was one of a number that had been imported together, a large proportion of which had already succumbed to the "parrot disease" and it seemed probable that our patient, who had cared for the bird while it was sick, had become infected by it. The cultures from the parotid gland confirmed this supposition for the bacteriological report that follows, although it does not conform in every detail with some of the published accounts of *B. psittacosis*, nevertheless shows that it belongs to the same group of organisms, individual strains of which are known to vary considerably in their behaviour in the laboratory.

There was slow growth on the usual solid media and on potato and slight hæmolysis on blood-agar; in nutrient broth a small petal-like growth developed upon the surface of the medium; no liquefaction of gelatin occurred and there was no anaerobic growth. The organism, which was in pure culture, was found to be a short bacillus with polar staining ends; in the early stages it was mainly Gram-positive, but after 48 hours' growth in vitro it became completely Gram-negative. The bacillus produced acid and a little gas with glucose and acid with mannite, but there was no reaction with lactose, saccharose, or dulcite. Litmus milk first became acid but in 24 hours rapidly became alkaline. There was very slight agglutination with paratyphoid B serum, but none with a serum of *Bacillus enteritidis* Gaertner. It was unfortunately impossible to obtain serum from the patient to test its agglutinating power against the organism isolated.

In March, 1929, while I was engaged in searching for further information in connexion with this curious disease I happened to describe this case to my surgical colleague Mr. H. H. Sampson, and he at once suggested that I should investigate the circumstances of several instances of mysterious illness that had occurred in a nursing home in Birmingham. My subsequent inquiries brought to light the following details:—

CASE 2.—Mrs. A., proprietress of a large nursing home, aged about 50 years, in November, 1928, purchased a parrot which shortly afterwards became ill with vomiting and diarrhœa. A veterinary surgeon was called in consultation and formed the opinion that the disease was not infectious to man and that no alarm need be felt on that account. Mrs. A. continued, therefore, to attend the parrot, frequently nursed it in her hands, and to keep it warm allowed it sometimes to sleep under a woollen jacket against her breast. The parrot eventually became so ill that it had to be destroyed. While attending the parrot Mrs. A. had an attack of what seemed to be simple bronchitis which kept her in bed for a few days. She appeared to be recovering, but a few days after getting up was seized with severe pain in her back and had to return to bed. During the last two weeks of her life she had a continuous temperature which varied between 100° and 105°F., with signs of diffuse bronchopneumonia in both lungs. It was noticed that the pulse-rate never exceeded 80 per minute to within about three days of her death in January, 1929, when it became very rapid. At the onset the bowels acted normally, but in a few days became very relaxed and finally she had incontinence of fæces. In the later stages of her illness there was retention of urine and she had to be catheterised; sweating was often profuse, abdominal distension was very marked throughout, and she vomited frequently after nourishment.

CASE 3.—A young woman of 27, by occupation personal maid to the proprietress of the nursing home (Case 2), assisted her mistress in the care of the sick parrot. On Jan. 17th, 1929, when her mistress was already gravely ill, she complained of severe headache and backache and her temperature was found to be 103°. At the onset of her illness she vomited frequently. Doubtful signs were found in the lungs and a tentative diagnosis of pneumonia was made, although there was no cough and respiration was not markedly increased. The pulse-rate varied between 100 and 110; sweating was profuse. During the next five days she had a high continuous temperature, between 103° and 104°; the pulse, however, remained relatively slow, at about 100 per minute. She was frequently delirious and had some diarrhœa. The diagnosis remained in doubt, but on the 22nd a rash was noticed and it was thought that she had scarlet fever, although she stated that she had had it twice previously. On that day she was sent to the City Hospital under the care of Dr. E. H. R. Harries, to whom I am much indebted for details of her subsequent progress.

On admission she was found to be of frail physique and in poor general condition. There was a good deal of nasal catarrh but the fauces and tonsils were clean and showed neither exudate nor injection. The tongue was clean, red, and dry, and there was no enlargement of the papillæ. There was a large patch of facial herpes. Across the abdomen and upon the back there was a punctate erythema, which Dr. Harries thought was probably a "flannel rash"; the skin was generally moist; the urine was normal. As there was no definite evidence of scarlet fever the patient was removed to an isolation ward and barrier-nursed throughout. A note made on her admission states that the first sound at the apex was soft and indistinct and the percussion note over the right lower lobe was impaired; in this area the breath sounds were harsh but there were no adventitious sounds.

On the following day she was very delirious and constantly attempted to get out of bed; she had an occasional cough. The abdomen was distended but no enlargement of the spleen could be made out; the rash had faded and tubular breath sounds with moist râles were now apparent at the right base. By Jan. 24th the rash had entirely disappeared, her respiration had become laboured, physical signs in the right lower lobe were more marked, and in the left lung expiration was noticed to be prolonged. Abdominal distension continued and she passed a good deal of flatus. The tongue was dry, brown, and cracked, and there was marked sordes. On Jan. 25th there was less distension but tubular breath sounds were present in both lungs with a large number of crepitations. She died on the following day; no autopsy was allowed.

During the whole of the four days that she was in the isolation hospital before her death the temperature was high and continuous and ranged between 105° and 102°. The pulse-rate reached 132 on the day before her death, but previously had averaged about 110 despite the high temperature.

In a personal letter to me about the patient, Dr. Harries says: "There was no evidence of scarlet fever; death was certified as due to pneumonia. In the light of what you say about the parrot and from a comparison of the notes of S. R.'s case with Macaigne's description of psittacosis it seems highly probable that she was an example of that condition."

Case 4 is a rather more doubtful one, but it is worthy of record that one of the sisters at the nursing home who came in close contact with Cases 2 and 3

and also with the parrot, suffered at the same time from an unusual and obstinate form of bronchitis from which she eventually recovered completely. The three cases from the nursing home were all under the care of one of my colleagues, with whom I have since discussed the matter. He has told me that their course was a very unusual one, and that at the time he was not at all satisfied with the tentative diagnosis of broncho-pneumonia. Although the responsibility of the parrot for their infection was not suspected during their illness or, indeed, until some months after the death of two of them, I think that the details that I have since been able to obtain leave practically no doubt of the true nature of their condition.

Clinical Manifestation of Psittacosis Infection in Man.

The first three cases described correspond very well with the text-book descriptions of psittacosis in man; the fourth may have been a mild infection. Clinically, the patients present evidence of septicæmia of the typhoid type complicated by unusual signs in the lungs suggestive of pneumonia. Vomiting at the onset is frequent and may persist; delirium is nearly always severe. The spleen is at times said to be enlarged, though apparently it was never so in any of my cases, and rose spots occasionally occur. Positive agglutination reactions with the typhoid group of organisms are sometimes met with but rarely to the marked degree found in my first case. An unusual symptom of diphtheroid stomatitis has been noticed in those who have practised what must be the difficult art of mouth-to-mouth feeding with parrots. The duration of the fever varies from 15 to 20 days and the total mortality is said to be extremely high, in the neighbourhood of 40 to 50 per cent., and even more than this in elderly people. It is a striking thing that while in parrots the lesions are limited to the alimentary tract, in human beings it is the pulmonary complications that are the most conspicuous features of the septicæmia.

The chief clinical point that emerges from this study is that anomalous cases of continued fever, in some ways suggestive of typhoid septicæmia with marked pulmonary involvement, should raise the question of the possibility of psittacosis infection.

Incidence of Psittacosis.

The paucity of references in English journals to psittacosis and its scanty treatment in the text-books show that in England it is a disease but rarely recognised; that its occurrence is as rare as its recognition is by no means certain. On the contrary, several considerations warrant the suspicion that this extremely serious condition may occur more frequently than is believed. Firstly, it is known that a number of imported parrots die of it; secondly, the infecting organism has been shown by many workers, particularly by Perry,[5] to belong to the salmonella group and to have close affinities with *B. paratyphosus*, *B. aertrycke*, and *B. enteritidis* Gaertner; there is no confirmation of McClintock's opinion that it is pleomorphic. It is further established that when removed from its host *B. psittacosis* can retain its virulence for a long period of time both in the dejecta and on feathers, and opportunities for infection must therefore be frequent, particularly among those who handle parrots. Thirdly, in human infection the symptoms are such that, unless they are fully aware of the existence of the disease, competent observers may be led to be content with an erroneous diagnosis of some form of pneumonia or of typhoid fever, as indeed would have been my own fate had it not been for the insistence of the niece of my patient (Case 1) on the correct diagnosis.

It is of practical importance to determine the manner in which parrots become infected. It has been suggested that the insanitary conditions which prevail in their journey from the tropics to Europe are responsible and, certainly, the fact that psittacosis is most common in newly imported birds supports this view. If this, indeed, be true it would be well for the responsible authority to insist on a period of quarantine for imported parrots before they are set free for sale. On the other hand, it may be that the sudden change of climatic conditions and from freedom to close confinement so reduces the general resistance of the birds that they fall a prey to invasion by an organism which they usually carry without ill-effect. If this view be correct any parrot in captivity may be a source of danger. To clear up this point I should be glad to receive swabs from dejecta of parrots for investigation. Lastly, I feel that the attention of veterinary surgeons should be directed to the extremely serious nature of psittacosis infection in man and to the established fact that it is generally acquired directly from sick birds (oddly enough, infection between individual patients seems to be rare though, of course, its possibility cannot properly be denied). The opinion expressed by the veterinary surgeon called into consultation on the nursing home parrot, the cause of infection of Cases 2, 3, and 4, was to me surprising, but I discovered that he may claim a certain amount of authority for it.

On turning to what appears to be a standard work [6] published so recently as 1920, I found that the authors do not regard it as proved that the disease of psittacosis can be transmitted to man and quote Leichtenstein, who says that "Epidemiological, clinical, and especially bacteriological evidence is not disclosed to prove that the infection of house epidemics of pneumonia, suspected of being psittacosis, did originate from sick parrots. The same house epidemics of pneumonia occurred not rarely without the intervention of parrots, and one may from this draw the conclusion that former psittacosis epidemics were nothing more than atypical pneumonia in which the sick parrot, accidentally present in the house, played no ætiological rôle."

The recovery of the organism in Case 1 of my series may, I hope, make a revision of this opinion possible.

References.

1. Boggs, T. R. (revised by Funk, E. H.): Osler and McCrae's Modern Medicine, London, 1926, ii., 211.
2. Macaigne, M.: Roger, Widal, and Teissier's Nouveau traité de Médecine, Paris, 1920, i., 306.
3. Gulland, G. L.: Brit. Med. Jour., 1924, ii., 309.
4. McClintock, G.: Publication No. 1 of McClintock Foundation, New York, 1925, Pleomorphism in Bacterial Protoplasm: A Study in Psittacosis.
5. Perry, H. M.: Brit. Jour. Exper. Path., 1920, i., 131.
6. Ward, A. R., and Gallagher, B. A.: Diseases of Domestic Birds, New York, 1920.

THE INTRATHECAL TREATMENT OF PARASYPHILITIC AFFECTIONS OF THE NERVOUS SYSTEM.

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JUST as intravenous salvarsan treatment has taken a number of years to attain universal recognition, so a long period will be necessary before the indications and simple technique of the endolumbar treatment of meningeal syphilis will become generally appreciated. Up to the present, views upon its suitability are much divided. A constantly reiterated objection is that the same results can be obtained with intravenous salvarsan treatment, both clinically and in the effects upon the cerebro-spinal fluid. It is quite certain, however, that in 20 to 40 per cent. of cases a pathological fluid cannot be cleared up with intravenous salvarsan treatment, the figure varying with the quality of the general treatment and the age of the infection, and becoming more and more unfavourable with advance in the age. No fluid has ever been permanently restored to normal by intravenous salvarsan treatment after the fifteenth year of infection. According to Gennerich, these conditions have been completely changed by the endolumbar treatment.

The Technique and Its Purpose.

As early as 1912 Wechselmann and Marinescu made injections of salvarsan into the lumbar sac and noticed signs of irritation in the spinal cord, corresponding with the site of injection, as the drug remained in the same spot. Swift and Ellis reported in 1913 on their new method with salvarsanised serum, and Fordyce and Lafora obtained very good success in all stages of meningeal syphilis, especially in the optic atrophy of tabes. Fordyce also had many remissions in general paralysis, but the permanent success was less satisfactory. The Swift-Ellis method has proved inefficient for older and deeper-lying parenchymatous processes in general paralysis and its preliminary stages in cerebral syphilis and in latent processes. The superficiality of the effect is easily explained by the very small quantity of salvarsan used in the Swift-Ellis method: less than $\frac{1}{3}$ mg. The small dose of salvarsan also explains the absence of excitatatory effects from this method, even in cases of severe spinal change.

In 1913 Gennerich began his treatment of syphilis of the central nervous system. He had ascertained, on the basis of many years' study, that, even in recent cases, neither clinical improvement nor benefit to the fluid could be obtained, in spite of energetic salvarsan treatment. Often, indeed, the condition became worse. He therefore decided to attack the syphilitic process not only through the blood but also through the fluid. He did not, however, use a serum for this purpose, but mixed the fluid which he took from the lumbar sac in quantities of 50–90 c.cm. with neosalvarsan and then let about two-thirds of this salvarsanised fluid run back again in the hope that, by this means, the salvarsan would reach the seat of the disease more effectively than if he left its distribution in the fluid to the existing limited circulation. The success of this treatment showed itself immediately. Whereas up to that time only 36 per cent. of cases of cerebro-spinal syphilis could be cured by intravenous treatment, Gennerich's figure rose to 76 per cent. Encouraged by this, he proceeded to treat the metaluetic process, with the same good results. With intravenous salvarsan treatment he was able to produce normal fluid and freedom from symptoms in three cases of early general paralysis; in six cases he got an improvement in health without cure of the fluid, while ten cases remained uninfluenced or grew worse. The endolumbar treatment, on the other hand, showed that out of 26 cases of tabo-paralysis remission was attained in 20 cases and that 5 cases were able to practise a profession.

Gennerich found that the success of the treatment depended upon the quantity of the dose. As it had been shown that the reliable maximum dose of salvarsan for a spinal cord suffering from pathological degeneration could only exercise an inadequate therapeutic influence on the brain, and that the brain could bear much higher doses without complications, the problem was to find out a means by which both processes could be treated simultaneously. This Gennerich attained through his double-puncture treatment. By this means it became possible to carry effective quantities of salvarsan into the cerebral fluid while the sensitive spinal cord did not come into contact with them for some time. For this purpose two punctures are made simultaneously, an upper one in the region of the lower dorsal cord and a lower one near the sacrum. From the upper five to six c.cm. are run out into a measuring-glass; from the lower 50 to 80 c.cm. or more, according to the body-weight of the patient. To the fluid obtained from the upper puncture is added a quantity of neosalvarsan varying from 1 to 3 mg., according to the disease process to be treated. If there is coincident tabes, $\frac{1}{4}$ to $\frac{3}{4}$ mg. of neosalvarsan are added to the fluid taken from below. After a thorough mixing of the fluids, first the upper and then the lower are run back. The head and upper part of the trunk must be kept low for 24 hours afterwards. Only about two-thirds of the lower fluid is reinjected, as there has been an excess of pressure, and withdrawal has a very favourable effect. The highly salvarsanised fluid has never been known to pass down into the caudal region of the lumbar sac and cause harm to the spinal cord. In the early stages of syphilis, in latent meningeal processes, in diffused syphilitic meningitis, and in the varied and more or less complicated symptoms such as attacks of cramp or disorder in the region of one or more cranial nerves, the cure of the fluid is very simple indeed. Since the introduction of double puncture it has been carried out in a far shorter time and usually with half the number of treatments required with simple puncture.

As soon as it is known what dose the degenerated spinal cord can bear (it varies between $\frac{1}{4}$ and $\frac{3}{4}$ mg.), the treatment can be carried out without any difficulty or complication. As the brain can bear more than five times as much as the dose mentioned for the spine, it is obvious that double puncture treatment should be used to the fullest extent if all cerebral disease processes are to be removed as rapidly as possible. That this treatment has led to a considerable advance in results may be seen from the following figures extracted from Gennerich: (1) cerebro-spinal syphilis was cured with the simple endolumbar treatment in 76 per cent. of the cases; with the double puncture treatment in 100 per cent. (2) For prætabes and tabes the corresponding figures are 73 per cent. and 100 per cent. (3) For optic atrophy in tabes the double puncture treatment showed an improvement or cessation of active disease in two-thirds of the cases. (4) In 31 cases of general paralysis and tabo-paresis professional capacity was restored or far-reaching remission attained in 80 per cent. and the fluid was restored to normal in 55 per cent.

In our own series 50 per cent. of the cases of general paralysis and tabo-paresis were able to carry on their professions. Dementing cases of general paralysis are the most suitable for endolumbar treatment; the expansive cases offer greater difficulties for purely technical reasons, on account of the psycho-motor restlessness. The demented forms seem to involve more superficial meningitic processes; the expansive forms evidently go deeper into the parenchyma and for this reason do better under malarial therapy. If the symptoms of the illness have been manifest more than three to eight months before treatment is begun, there is little hope of success. As the case improves clinically so the fluid shows retrogression or disappearance of the positive Wassermann, albumin, and cells. If the treatment is broken off too early there is always a rapid deterioration.

Duration of the Improvement.

Gennerich reports cures lasting up to four years. We have a case of pronounced general paralysis that has been in complete remission for five years. Other patients can carry on their profession from six months to two years after treatment. Professional capacity could be attained in about half the cases and a far-reaching improvement in one-third of the remainder, so that no paralytic has been detained in my sanatorium since the introduction of endolumbar treatment. All patients treated by us live at home and come in at intervals of one to three months, or even longer, for two to four days' treatment.

Simultaneously with the endolumbar treatment, the patient undergoes an intravenous salvarsan treatment alternating with bismuth and iodine.

Whether or not a real cure of general paralysis can be attained with this treatment cannot be said with any certainty. Cure is anyhow only conceivable in quite recent cases, and, provided that the two methods, endolumbar and intravenous, cover the area of the disease.

Disease of the Spinal Cord.

The most difficult field of application for endolumbar treatment is, without doubt, spinal infection, where, owing to degenerative changes, the cord can only

bear about a quarter of the endolumbar dose which has been proved safe for a healthy spinal cord. In the presence of all metaluetic processes, tabes as well as myelitis, the salvarsanised fluid penetrates much more easily into the nerves, and may therefore very easily injure them and thereby cause a cessation of function which can only be set right with difficulty if at all. The greater the inflammatory changes in the fluid—i.e., a high cell count—the higher can be the endolumbar dose, and the greater the diminution in the meningeal inflammation, the more urgent is the restriction of the endolumbar dose within those limits which experience has proved to be safe; that is to say, 0·5 mg. to 60 or 80 c.cm. of fluid, or still less if possible. Gennerich has succeeded in proving the permeability of the pia in general paralysis, tabes and optic atrophy, and shown the essential importance of diffusion of the fluid in setting up metaluetic processes. In treating all late stages in the central nervous system, it is essential to understand this diffusion, as it is otherwise impossible properly to estimate the dose for endolumbar treatment.

Indications for Endolumbar Salvarsan Treatment in Tabes.

For all cases of stationary tabes with normal fluid specific treatment and endolumbar treatment may be used. We treated a case experimentally with the endolumbar method and were able to convince ourselves that, when symptoms had existed for more than five years, neither an appreciable improvement in the ataxia nor any considerable diminution in the attacks of pain could be achieved. In all those cases, however, where there are slight changes in the fluid, the process is progressing slightly or severe attacks of pain occur, endolumbar treatment should be tried, as with careful administration it may lead to very far-reaching improvement.

In gastric tabes also early treatment may lead within a short time to a complete removal of the disorder and, finally, to a definite suspension. The effect of endolumbar treatment on older cases of gastric tabes is exceedingly varied. Isolated cases are freed from disorder after one or two treatments, but the great majority prove uncommonly stubborn. Many react with very severe crises, so that they are no longer fit for treatment without special preparation. Gennerich gives them a preliminary paravertebral injection of antipyrin (15 per cent. alcoholic solution with novocain), which facilitates the subsequent endolumbar treatment.

The treatment of degenerative optic atrophy is very gratifying and improvement may be expected in two-thirds of the cases. The dose must not exceed 1 mg., as the degenerated optic nerve shows the same irritability as the degenerated spinal cord.

If in the course of tabes severe changes take place in the fluid (strongly positive Wassermann, gold test, and mastisol curves, and large albumin values), pointing to cerebral involvement, double-puncture treatment is indicated. In simple cases of tabes the single puncture treatment suffices.

It has been contended in Germany that endolumbar treatment is dangerous, but this is not correct. According to Gennerich, the mortality-rate is 0·2 per cent. provided asepsis is complete; complications can be excluded with certainty if technical skill is attained. To secure this and to obtain the necessary knowledge of the most important question of dosage, any practitioner who wishes to use endolumbar treatment must undergo a thorough, practical introduction to the method. Temporary spinal irritation only occurs as a complication in about 3 to 5 per cent. and exercises no influence upon the final result of the treatment. Occasionally after the first treatment the Herscheimer reaction appears as attacks of cramp or acute relapse, but this is never more than temporary.

Still more important than treating the manifest metalues is preventing it. The premonitory symptoms of meningeal inflammation are known to occur in the earliest stages of syphilis and to carry on the disease process—according to the proportion between virulence and resistance—while the patient goes his way for many years, suffering no inconvenience, unwarned and free of misgivings, towards an unhappy fate and chronic illness. By investigating the fluid at the proper time the threat could be recognised, and treatment given which would guarantee certain cure of all latent meningeal processes.

SELF-RETAINING TUBES FOR THE OPERATIONS OF CÆCOSTOMY AND CYSTOSTOMY.

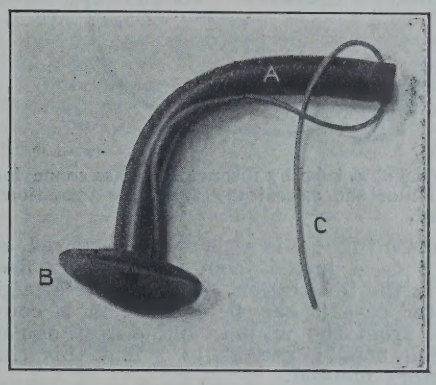
By F. WILSON HARLOW, M.B. Durh., F.R.C.S. Eng.,

SURGEON TO THE ANGLO-SWISS HOSPITAL, ALEXANDRIA, EGYPT; LATE RESIDENT SURGICAL OFFICER TO THE ROYAL NORTHERN HOSPITAL, LONDON.

THE operation of cæcostomy is undertaken, more often than not, under the most adverse surgical circumstances as regards the general condition of the patient; or else it is performed as an adjunct to a larger and often drastic abdominal operation. The time factor is therefore of peculiar importance. From my consideration of the results of others, and from my own experience, I observed that unless a fairly considerable time was taken for careful suturing of the cæcum around the tube the result was unsatisfactory; both in the deflation of the large gut and lower ileum in the early stages, and in the fistula produced after removal of the tube.

I therefore endeavoured to devise a more rapid technique for my own use, and as a result the cæcostomy tube illustrated was constructed. Briefly, it consists (Fig. 1) of a stout rubber tube A, 1 cm.

FIG. 1.



Cæcostomy tube.

in diameter, with a wall 0·3 cm. thick. Attached to one end is a bag B, of thinner rubber, like a miniature air ring in appearance and structure and 6 cm. in diameter. A supply tube C is connected to B, and runs alongside the main tube A; it is of a calibre equal to that of the nipple of a record syringe. The technique of the operation is as follows:

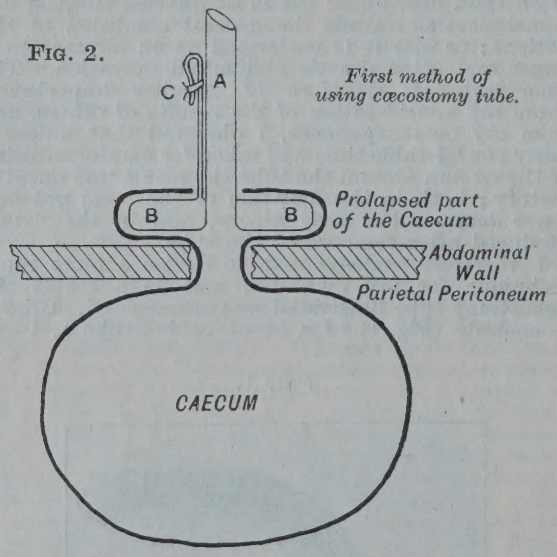
A 5 or 10 c.cm. syringe is filled with sterile water and fitted by its nipple to the tube C. The bag or rubber flange B is now distended until quite hard and firm by driving home the piston in the syringe. The amount required to produce this distension is noted. The syringe is disconnected, after sucking back the fluid from the bag, and its contents are discharged. The syringe and rubber cushion flange are thus completely emptied.

Filled with the required amount of sterile water, the syringe is once again connected to the supply tube C, but the piston is not driven home. The collapsed cushion flange is folded on itself into four layers and held in this position by lightly-

clamped sponge-holding forceps or large artery forceps. The actual operation is now commenced. The routine muscle-split incision is made not more than three inches long, and the peritoneum is picked up and divided in the usual way. The cæcum is sought and a portion of its anterior wall brought out of the wound by the fingers, aided by mouse-toothed Porier's forceps or Lane's forceps. These forceps are then attached to this protruded portion of the cæcum at either end of the wound so as to anchor it in position, and gauze is packed around to prevent soiling of the wound edges.

A purse-string suture is introduced into the cæcum enclosing an area 2 cm. in diameter, which is then incised longitudinally for almost its full extent. The collapsed cushion flange of the tube, held folded in the forceps, is immediately inserted into the cæcum. The forceps are then taken off and the purse-string suture rapidly tied. The piston of the record syringe is driven home, thus converting the collapsible rubber bag into a firm flange which effectually anchors the protruding portion of the cæcum in position. The syringe is disconnected and the supply tube doubled on itself and tied with any available ligature material. The protecting gauze is then removed and a silkworm gut suture introduced through all the layers of the abdominal wall at either end of the incision. When these are tied, the abdominal wall fits snugly round the prolapsed piece of the cæcum. Except for dressings and the

FIG. 2.



attachment of a tube by means of a glass connexion to the distal end of the cæcostomy tube, the operation is now completed.

The main tube A is either made curved at right angles 3 to 4 inches from the cushion flange, as shown in the illustration, or else quite straight. In the latter case it can be divided at a convenient distance from the wound, and a rectangular glass connexion fitted; personally I find this the more satisfactory method.

The cæcostomy tube can be removed when required by aspirating the water from the cushion flange with a record syringe fixed to the supply tube. It will then be found to slip out quite readily. The larger size of the cushion flange when distended, in contrast to the glass flange of a Paul's tube similarly used, holds open and from the first prevents any possibility of occlusion of the fistula produced. Also it will be found that a larger permanent fistula (lined by mucous membrane) eventually results after removal of the cæcostomy tube.

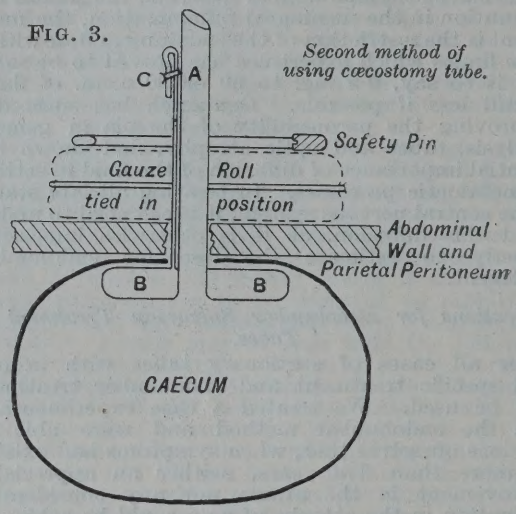
Fig. 2 shows a sectional view of the cæcostomy tube in position at the end of the operation.

This method of using the tube is only possible when the cæcum is sufficiently mobile to allow a pouch to be brought through the abdominal incision. For descriptive purposes it has been labelled the first method of using the cæcostomy tube.

When the cæcum is fixed and immobile, and a pouch of its anterior wall cannot be brought through the abdominal incision, an equally satisfactory result can be as rapidly produced by a slight variation of the technique. The modifications are as follows.

A somewhat larger incision will, as a rule, be necessary. A suitable portion of the anterior cæcal wall is then anchored at the bottom of the wound by grasping either end of the part exposed with Porier's forceps. These forceps are now held by an assistant, and the general peritoneal cavity is protected from soiling by gauze packing tucked under the wound edges. The insertion of purse-string suture and

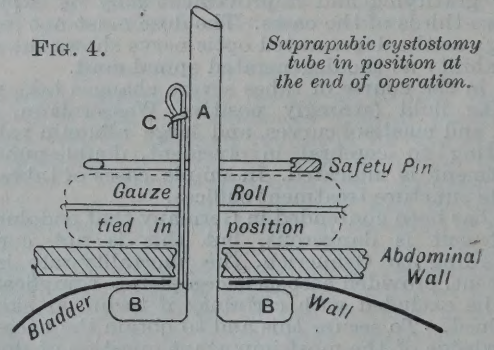
FIG. 3.



cæcostomy tube is carried out as before. The assistant now removes the Porier's forceps and packing, and applies traction to the cæcostomy tube. The anterior cæcal wall, which has been spread out over the upper surface of the distended cushion flange, is thus brought firmly against the parietal peritoneum. The two silk-worm gut sutures are now inserted and tied; and one or two large safety-pins are fastened into the main tube one inch from the wound, roughly one and a half inches distal to the cushion flange. If two safety-pins are used they are placed at right angles to each other. While the assistant still maintains traction on the cæcostomy tube, a roll of sterile or iodoform gauze is wound round the tube between the abdominal wall and the safety-pins and fixed firmly in position by tying some ligature material around the roll after encircling it several times. The safety-pin constitutes an external flange, and the roll of gauze and layers of the abdominal wall a washer between it and the internal cushion flange.

The anterior cæcal wall is thus maintained in contact with the parietal peritoneum, to which it forms

FIG. 4.



adhesions around the opening for the tube. To ensure continuous close contact between these layers of visceral and parietal peritoneum, the gauze washer should be supplemented at each dressing, while traction is exerted on the cæcostomy tube by a nurse or assistant. The cæcostomy tube can be removed as readily as in the previous cases, after removing the water from the cushion flange, when the adhesions are firmly established. An equally satisfactory fistula will result. It was in experimenting on these cases in the cadaver that the advantages of a known volume of water over an uncertain volume of air were dis-

covered, and water is therefore now used in all cases instead of air.

Fig. 3 illustrates a sectional view of this method, called for descriptive purposes the second method of using the cæcostomy tube. The tube, as illustrated and described, is the size found most suitable for well-developed adults. It is especially useful when employed according to method II. in the case of an obese patient with a thick abdominal wall. For emaciated and less well-developed patients it will be found too large and cumbersome, and for these cases a second size of tube has been constructed, smaller in all its proportions. The tube A is 0·75 cm. instead of 1·0 cm. in diameter, and 0·2 cm. instead of 0·3 cm. in the thickness of its wall. The diameter of the cushion flange is 4 cm. instead of 6 cm.

A New Pattern Cystostomy Tube.

A cystostomy tube has also been produced on exactly the same principles. The diameter of the cushion flange B is 4 cm., the main tube A has a wall 0·3 cm. thick and a bore of 0·5 cm. The supply tube C, which also runs alongside the main tube A is identical with that in the cæcostomy tube—namely, just large enough to fit the nipple of a record syringe accurately.

It is not necessary to describe in detail the operation of cystostomy and the insertion of the tube. Before beginning the operation the collapsed cushion flange is folded on itself in four layers, and held in this position by a lightly-clamped pair of artery forceps. A record syringe containing the known quantity of fluid required to distend completely the internal flange is attached to the supply tube. The bladder is reached and opened in the routine way, and the folded cystostomy tube thrust in. The artery forceps are removed and the flange distended by discharging the water from the syringe down the supply tube into it. The syringe is removed and the supply tube doubled on itself and tied off as in the operation of cæcostomy. The operation is now completed by suturing the recti abdominales and sheath, together with catgut above and below the tube, and similarly closing the skin incision with silk-worm gut or clips. It is probably safer to insert a small drain to the suprapub space, though lately I have been omitting this without any harmful results. Finally, whilst an assistant applies gentle traction to the tube, a safety-pin and gauze roll are applied, exactly as described in the second method of performing cæcostomy (Fig. 4). The drainage of urine has been found to be more satisfactory than with the other types of cystostomy tubes even when no automatic aspirating apparatus was used.

The collapsed cushion flange, folded as described, can be inserted through an opening in the bladder of less than half its diameter in the distended condition. In consequence no sutures in the bladder wall are necessary to retain it firmly in position once it has been inserted, and urine does not leak around it if the pin and gauze flange are properly fixed. So far these cystostomy tubes have remained continuously in position and drained satisfactorily until it was decided to remove them. After aspirating the water from the cushion flange with a record syringe they come away easily and painlessly, only quite gentle steady traction being required to effect their removal.

The majority of surgeons will admit that all the usual types of cystostomy tubes can and do become displaced at times, however careful the nurses and patients may be. Cystostomy patients are very often mentally unable to assist at all in preventing this. Such minor catastrophes are not only alarming to the patients themselves but, as they often occur at the most inconvenient hours of the day or night, they are also productive of much annoyance to the busy surgeon. There are, however, already so many forms of cystostomy tubes designed for the operation of suprapubic cystostomy that it was, after considerable hesitation, that I had the temerity to suggest an addition to their number. It was only the fact that so far I have never had to replace one of this particular variety that finally led me to do so.

All forms of the tubes described are made for me by Charles F. Thackray, Surgical Instrument Maker, 119, High Holborn, W.C.1, to whom I am indebted for assistance in the experimental stages.

Clinical and Laboratory Notes.

CRUCHET'S "ENCÉPHALOMYÉLITE SUBAIGUË DIFFUSE" AND EPIDEMIC ENCEPHALITIS LETHARGICA.

BY CONSTANTIN VON ECONOMO,
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IN the winter of 1916–17 I made observations on a small epidemic that occurred in Vienna. The infection was one which had not been known previously. It is a matter of common knowledge that on April 17th, 1917, I delivered a public lecture and showed patients before the Psychological and Neurological Association of Vienna, entitling my address "Encephalitis Lethargica." I gave the disease this name because the majority of the patients showed somnolence and disorder of the optic musculature, but I exhibited at the same demonstration patients with other symptoms and without drowsiness. I identified the disease with the mysterious "Nona" of 1890.[1] I also produced specimens showing the pathological anatomy, from which I proved that, despite the varying clinical picture, the condition was a disease-entity characterised by non-purulent non-hæmorrhagic inflammation of the grey matter: an inflammation consisting of a large number of small foci and involving the whole nervous system though chiefly localised in the grey matter of the mid-brain.; and one with no tendency to necrosis or softening. A few weeks later, working with Wiesner, I proved beyond controversy that the disease could be transmitted to monkeys and that it was therefore infectious. Since then epidemic encephalitis lethargica has been universally recognised as a disease-entity, and is described by many authorities under the shorter name of epidemic encephalitis.

A few months ago Cruchet published a short monograph entitled "Encéphalite épidémique—les 64 premières observations"[2] in which he claimed to have been the first to discover the condition. He asserted that he had described the first forty cases under the name of "encéphalomyélite subaiguë diffuse." This paper appeared in the *Bulletin* de la Société Médicale des Hôpitaux de Paris for April 27th, 1917. Since in any case it was published ten days after mine, I have the priority of date. Cruchet, however, claims that his work was published on April 1st, since that was the day on which he entrusted it to the post. This is against all custom, but even if it stands I can place my date of publication before that of Cruchet.

There is, therefore, no question about the priority of my paper. Moreover, I do not attach much importance to these dates, since I am satisfied that Dr. Cruchet could have known nothing about my work at the time he wrote his. The point I consider to be of far more importance, however, and which will at once be plain to every reader who studies Cruchet's cases in detail, is that the picture they show is in many respects quite different from that of epidemic encephalitis lethargica. If we select from his 64 cases the 40 which he saw before April, 1917, and discussed in his first paper, it is obvious that only a single one of them, to wit No. 45, represents a true encephalitis lethargica. In two other cases only—Nos. 16 and 29—there is a certain possibility of a differential diagnosis of encephalitis lethargica. All the remaining 37—or 39 if these two be included—show, by Cruchet's own description, no symptoms of epidemic encephalitis lethargica at all. They are all war-time psychoses, epilepsies, hemiplegias, or cases of myelitis or neuritis. None of the familiar symptom-complexes of encephalitis lethargica in its many forms plays a part in any of them and not one of them shows

[1] Jahrbücher f. Psychiatrie, xxxix., 202.
[2] Doin et Cie, Paris.

any symptoms of the mid-brain. If these 37 or 39 cases really manifest a disease-entity, as Cruchet says they do, it is a very different one from the encephalitis lethargica described by me. In the last few years we have come to recognise a variety of nervous diseases which are probably infectious, but are not encephalitis lethargica, such as Redlich's encephalitis cerebelli et pontis, Albrecht's encephalomyelitis migrans, Japanese encephalitis, and many varieties of acute multiple sclerosis. Sicard, the distinguished neurologist who died a short time ago, regarded epidemic singultus as distinct from encephalitis lethargica, and aptly suggested that these other varieties of encephalitis should be known by the name of para-encephalitis. If, therefore, Cruchet's cases really display a disease-entity—a hypothesis for which he provides no proof in his last monograph—his "encéphalite subaiguë diffuse" is at best one of these para-encephalitic conditions. It can hardly be assumed that 39 out of the 40 cases described by Cruchet as encephalitis lethargica showed quite an atypical form.

Such anatomical details as Cruchet gives also make it quite obvious that his cases were not encephalitis lethargica at all. Only two of his cases were investigated anatomically; in one of these the examination was purely microscopical and revealed one or two large hæmorrhagic foci in the cerebellum, and none of the non-hæmorrhagic polio-encephalitis characteristic of my encephalitis lethargica. The other, No. 49, had presented throughout the clinical picture of Landry's myelitis; microscopical examination revealed a single focus of inflammation, as large as a pea, with a necrotic centre, in the white and grey substance of the medulla oblongata in the region of the hypoglossal nerve. The isolation and size of this focus, and particularly the central softening, show that it was produced by some other myelitic process and not by encephalitis lethargica. Cruchet, moreover, mentions especially that the cases he quotes showed no epidemic character.

It is clear, from all these considerations, that the question of priority does not arise; not only because my paper appeared ten days earlier than Cruchet's, but also because his encéphalomyélite subaiguë diffuse, if it is a disease entity at all, is quite distinct both clinically and anatomically from epidemic encephalitis lethargica.

A SIMPLE METHOD OF DEALING WITH CONGENITAL FISTULÆ.

BY R. J. MCNEILL LOVE, M.B., M.S. LOND., F.R.C.S. ENG.,
ASSISTANT SURGEON, METROPOLITAN HOSPITAL, LONDON; LATE SURGICAL FIRST ASSISTANT, LONDON HOSPITAL.

CONGENITAL fistulæ in the neck, owing to continuous or intermittent discharge of glairy mucus, are a source of great annoyance to their possessors, particularly when adolescence is reached and a greater pride is taken in clothes and personal appearance. The two fistulæ for which treatment is most commonly sought are branchial and thyroglossal.

Branchial fistulæ are due to the non-closure of a cervical cleft, and are most commonly seen along the anterior border of the sterno-mastoid muscle near its lower end. They may extend upwards as high as the bifurcation of the common carotid artery. Very rarely they are completely patent, the inner end opening in the supratonsillar fossa.

Thyroglossal fistulæ are due to the non-obliteration of the thyroglossal duct, which extends from the foramen cæcum in the tongue to the isthmus of the thyroid gland. Authorities differ regarding its precise relationship to the hyoid bone, but from the surgeon's point of view the relationship is so intimate that if the fistula extends above the hyoid bone then the middle quarter of an inch of bone should be resected. The upper part of the thyroglossal duct occasionally remains patent, but this condition passes unnoticed during life, as the secretion merely mixes with the saliva.

The difficulty of complete removal of congenital fistulæ is largely due to the inability to ascertain their precise extent. This fact was well illustrated in one case which came under my notice in which five attempts had been made to remove a thyroglossal fistulæ. As a result the patient's neck was disfigured by an ugly contracted scar, from the lower end of which mucus still escaped. Further dissection with the removal of the centre of the hyoid bone and a wedge of the tongue muscle resulted in cure.

Attempts to inject opaque substances, with subsequent radiography, are not always successful, as the orifice of the fistula may be almost capillary in calibre, and the outlying portions of the fistula already contain mucus. Again, passage of a probe is uncertain, as constrictions in the fistula may hinder its progress.

A simple procedure which greatly facilitates removal consists in encircling the orifice of the fistula with a fine purse-string suture of horse-hair. This is inserted as close to the orifice as possible and tightened so as to close the opening. In a few days continued secretion begins to distend the fistula, converting it into a cyst. When sufficiently tense, the limits of the fistula are clearly definable, and accurate dissection and complete removal with a minimum amount of trauma are then comparatively easy.

CASE 1.—Female, aged 22. Branchial fistula, 1 inch above sternum along anterior border of right sterno-mastoid. Injection of bismuth paste and radiogram suggested that the fistula was about ½ inch in length and passed inwards. A purse-string suture was inserted, and three weeks later a firm cord-like swelling was easily palpable, passing inwards and downwards. Under local anæsthesia this was dissected out, the fistula being 1¼ inches in length and passing downwards and inwards under the deep cervical fascia. Section showed columnar epithelium.

CASE 2.—Female, aged 12. Thyroglossal fistula. Seven days after purse-string closure, was distended, passing upwards and apparently attached to the hyoid bone. On dissection it was found to be attached to the posterior aspect of the bone, reaching as high as its upper border. The middle portion of the bone was removed. Section showed columnar epithelium with the remains of cilia.

Both wounds healed by first intention and have remained healed after a lapse of several months.

CENTENARY OF CHESHIRE MENTAL HOSPITAL.—The centenary of the Cheshire County Mental Hospital at Upton, Cheshire, was celebrated on July 2nd.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.—The course in gastro-enterology, tentatively arranged for July 22nd to 26th, has been postponed and will be held at the Prince of Wales's Hospital, Tottenham, from Sept. 30th to Oct. 4th. There will be three courses in August: In urology, at the All Saints' Hospital, Vauxhall Bridge-road, occupying each afternoon from July 29th to August 24th; in diseases of children, at the Queen's Hospital for Children, Bethnal Green, occupying most of each day from August 12th to 21st; and in medicine, surgery, and the specialities at the Queen Mary's Hospital, Stratford, occupying the whole of each day in demonstrations, operations, and lectures in the various departments, from August 26th to Sept. 7th. Subjects of courses in September include diseases of the chest at the Brompton Hospital, from Sept. 9th to 14th; diseases of infants at the Infants Hospital, from Sept. 9th to 21st; psychological medicine at the Bethlem Hospital, Tuesday and Saturday mornings, from Sept. 10th to Oct. 5th; and medicine, surgery, and the specialties at the Westminster Hospital, from Sept. 16th to 28th. The following special courses have been arranged in addition to the list published for the year: evening course for the M.R.C.P. Lond., from Oct. 15th to Dec. 6th (Tuesdays and Fridays at 8.30 P.M.); and an all-day course in medicine, surgery, and the specialties at the Metropolitan Hospital, Kingsland-road, from Oct. 21st to Nov. 2nd. Syllabuses of special courses, together with information about the general course of work, may be had from the Secretary of the Fellowship of Medicine at 1, Wimpole-street, London, W. 1.

Medical Societies.

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES.

THE annual meeting of this Society was held in London on July 12th, with Dr. J. H. COUTTS, the President, in the chair. After the transaction of business, which included the re-election of the President, the discussion was resumed on Col. HARRISON'S paper, read at the last meeting,[1] on

EXPERIMENTAL WORK IN SYPHILIS AND ITS POSSIBLE BEARING ON MAN.

The PRESIDENT remarked that many of the conclusions which were drawn from the experimental work on animals were disconcerting to those treating the human being, and seemed contrary to preconceived ideas. The subject of immunity, both to tuberculosis and syphilis, was remarkably complex. It was hoped that this country would not be so behindhand as in the past in carrying out research on it. The United States were affording a valuable object-lesson in this respect, and to-night the Society was fortunate in the presence of Dr. Louise Pearce, of the Rockefeller Institute of Medical Research.

Dr. LOUISE PEARCE said she had read Col. Harrison's able review, and had been invited to give a short account of the work which had been carried out on syphilis by Dr. Wade Brown and herself, working entirely with the rabbit, in which animal the disease was found to be as characteristic as in the human. It was a chronic disease, and strains were used which were passed from rabbit to rabbit many times, being each time capable of imparting the disease. It was non-lethal and was self-limited, in that the manifestations eventually disappeared. The rabbit, however, remained infected as long as it lived, and the spirochæte could at all times be recovered from the lymph nodes. Two or three weeks after intratesticular inoculation one found the first clinical manifestations of the disease. In the third week a primary orchitis developed. After two or three more weeks that lesion regressed and almost healed. The second latent period was the fifth week. After a variable period of time—usually seven weeks—if one testicle had been inoculated, there was a metastatic orchitis, and, shortly afterwards, secondary lesions were found in the bones; after a further period the skin and mucous membranes were involved, and then the eyes. After three to four months the manifestations of disease had all practically healed except the residual lesions of the tunics, the epididymes, and sometimes the testes. The animal thus recovering could be proved to be a carrier only by inoculation of its tissue into another animal. The typical order or sequence of infection of tissues was: bone, skin, mucous membrane, eyes, though this was not invariable. If five animals were inoculated in the testes with a given dose of inoculum, one would be found to have severe syphilis, one very mild syphilis, and three disease of intermediate severity.

In work of this kind it was very important to use and have available a large number of animals. At the Rockefeller Institute a round was made of the patients every morning, just as in the human wards of a hospital. The strains of spirochæte used must be virulent—i.e., they must be able to induce manifestations of the disease; also there must be an appropriate adaptation of the rabbit's tissues; the soil must be suitable; and the dose must be adequate. The route of inoculation was likewise important. In the animals she used, the inoculations were intratesticular, scrotal and ocular. When no primary lesion was supposed to have occurred after intravenous injection she thought there were multiple primary lesions. So far as the work had gone, the characteristics of the host seemed to be relatively more important than the characteristics of the parasite, so far as the eventual outcome of the disease was concerned. The "host factor" included breed, sex, age, and general condition. The ordinary grey-brown rabbit gave the best results. The New Zealand red rabbit proved to be very resistant to the disease. If the animal was in poor health, the results of the experiment were not satisfactory. Environmental conditions were also very important; for instance, caging or a sedentary life had a marked influence on the manifestation. The animals were separately caged and fed on a standard diet. If inoculation was carried out within two or three days of the animal's arrival, the usual result was to get a more severe disease than if the animal were first kept three or four weeks—i.e., after it had become adapted to the sedentary life. Also the experimentally induced disease was much more severe in spring and autumn than at any other time. To further elucidate this point, sets of animals were placed in three kinds of rooms: an ordinary animal room, lighted by two windows of ordinary lead glass facing south; a room strongly illuminated by electricity the whole time; a room continuously dark. The animals were detained there during the four months of the experiment. It was found that the disease manifestations—i.e., the efficacy of the reaction—increased with the amount of light and the constancy of exposure to it. Animals in the constantly dark room showed deterioration, particularly changes in the thyroid, thymus and parathyroid glands. In some of the rabbits a complete, in others a partial thyroidectomy was performed, and the inoculation of the spirochæte which followed this gave such severe syphilis as the speaker had seldom seen. It seemed that the resistance to the disease was subject to the same influences as those concerned in regulating growth and maintaining the general metabolic activity. Dr. Pearce's latest inquiry concerned the effects of dosage and the various routes of inoculation. If one simply dropped a suspension of 0·2 c.cm. inoculum into the eye, it was diluted, and one did not know how many spirochætes remained adherent to the surface—probably very few. In some previous work she noted that when this route was chosen the disease was very mild, especially in comparison with the following intratesticular inoculation, the material in the latter case being forcibly injected. Metastatic orchitis was, strictly speaking, a secondary lesion, but the conditions of growth were so different that she and her colleagues made a separate division for it. All the animals experimented with developed generalised lesions. With intratesticular inoculations the dose was enormous in comparison with the ordinary dose received by the human beings, and so the primary lesion was an enormous one. The result of that, presumably, was a rise in immunity, or an increase in the efficiency of the immune reaction. If both testicles were inoculated—i.e., if a double lesion were produced, the primary syphilitic lesion was doubled, but there were not so many secondary lesions.

Another set of experiments, said Dr. Pearce, was also very instructive—namely, concerning double or concomitant infections. By chance, she had found that an animal sent from Europe supposed to contain certain strains of *Spirochæta pallida*, also carried a vaccine virus. Injecting the latter into an animal at the same time as the spirochæte resulted in what could only be called malignant syphilis. If intratesticular syphilis was inoculated into a vaccine-immune animal, the syphilis was mild. If into the same testicle vaccine virus and syphilis were inoculated, again the syphilis was mild. The reason, probably, was that the destruction of tissue had provided a poor medium for the growth and distribution of the spirochætes. The influence of one infection on another, well recognised in connexion especially with children's diseases, she did not think had been sufficiently realised in this work. Blood examinations showed a tremendous increase in mononuclear cells in the

[1] See THE LANCET, 1929, i., 1248.

circulating blood at the time of the occurrence of the metastatic orchitis and the secondary lesions. Similar changes were seen in association with virus disease, and also in malignant tumours of rabbits.

In conclusion, Dr. Pearce said it was necessary to observe considerable caution in applying results obtained in animal work to the human being. The disease presented many points of similarity in the two cases, but also many differences. She also insisted that before results of work were given out to the world, considerable numbers of animals should have been used, to avoid all accidental error.

The PRESIDENT spoke of the great value of the research carried on by Dr. Pearce, which required much patience, as weeks of observation were sometimes needed in order to establish one apparently small fact.

Mr. DAVID LEES agreed with Dr. Pearce about the caution needed before applying to man the results of animal experiment on this subject. Some said that better results from the treatment of syphilis would be obtained by waiting until about the eightieth day after the infection was acquired before initiating salvarsan therapy.

Dr. H. M. HANSCHELL asked whether Dr. Pearce found, in these experiments, lesions in the walls of the arteries and other vessels.

Dr. PEARCE replied that practically no lesions of the vessels were to be found with the exception of those of the heart, and only very few there. Many more granulomatous lesions were found if the animals were killed at the beginning of the secondary period. The lesions in the rabbit seemed to be peripheral rather than central.

SOCIETY FOR THE STUDY OF INEBRIETY.

AT a meeting of this Society held on July 9th, Mr. W. MCADAM ECCLES took the chair and delivered his presidential address, which was entitled

Some Gaps in the Scientific Study of Inebriety.

Much, he said, remained to be discovered about the effect of varying percentages of circulating ethylic alcohol upon the cellular contents of the blood and upon the blood-plasma itself. Arteriosclerosis was now reported as one of the principal causes of death; had alcohol any effect on the delicate cells of the arterial walls, and was arteriosclerosis more common in immoderate than in moderate drinkers of alcohol? Was the low expected mortality of the total abstainer due to freedom from arteriosclerosis? Alcohol in large doses caused peripheral neuritis, and it might be that much lower dilutions might affect the more delicate nerve mechanisms of the blood-vessels. This might perhaps be a cause of the stigmata seen on the cheeks of those who indulged freely in alcohol. Investigation was required to establish whether alcohol circulating in the blood affected the muscular tissue of the heart as well as the endocardium, and to discover the cause of fatty degeneration of the heart, which occurred even in moderate drinkers. Modern text-books gave no explanation of the nature of delirium tremens. If it were due to circulating ethylic alcohol, the practice of tapering alcohol in its treatment was illogical. The possibility that it might be due to another constituent of the beverage, or to some toxin produced in the body, should be investigated. Work was also necessary on the effects of alcohol on urine excretion, and the length of time taken by the alcohol from one glass of champagne to appear in the urine and to disappear from it; the results might be useful in establishing tests for drunkenness in motorists.

Sir WILLIAM WILLCOX then opened a discussion on the

Toxic Effects of Methylated Spirits and Impure Forms of Alcohol.

In 1858, he said, the Government had felt that alcohol used in art, commerce, and industry should not pay a tax, and for this reason methylated spirit, or ethyl-alcohol containing 10 per cent. of wood naphtha, had been introduced. During the war the authorities had found that people could drink this spirit, and a mixture was produced containing 9·5 per cent. of wood naphtha, 0·5 per cent. of pyridine, and 0·375 per cent. of paraffin, together with some colouring matter. The methylated spirit of to-day was poisonous both internally and externally. Its use in industry was hampered by the substances it contained, and another spirit had therefore been introduced consisting of 90 per cent. of ethyl-alcohol mixed with 5 per cent. only of wood naphtha. This industrial spirit was sold under strict safeguards. Surgical spirit was industrial spirit to which had been added 2½ per cent. of castor oil and 1 per cent. of boric acid, to make it still more unpalatable.

Many cases of illness due to methylated spirit drinking had been observed. In America 2000 deaths from this cause had been recorded in 1926. The evil had been prevalent in Scotland in 1922, and a convention of the Royal Burghs had met and passed stringent regulations to prevent it. Isolated cases had occurred in this country, but the speaker had never met one in which the patient had taken the spirit sold nowadays. Methylated spirit produced much the same symptoms as alcohol. The most dangerous of the effects of the methyl-alcohol, or wood naphtha, was blindness, but the speaker did not know that any case had been recorded in this country. In the great eye hospitals, however, about 5 per cent. of the cases of optic atrophy were due to undiscovered causes, and perhaps methyl-alcohol had not been sufficiently considered as a possible factor. A departmental committee which had sat in 1926 had decided that it would not be in the general interests of the community to label methylated spirit as poison. In the United States, however, every package containing less than five gallons was marked with a skull and cross-bones, and the inscription:

"Completely de-natured alcohol is a violent poison. It cannot be applied externally to human or animal tissues without serious injurious result. It cannot be taken internally without inducing blindness and general physical decay, ultimately resulting in death."

This summed up the whole situation: it was the impure forms of alcohol which were dangerous to life and sight.

Methyl-alcohol was slower than ethyl-alcohol in its action, and symptoms might not appear for several hours.[1] It produced gastric irritation, with abdominal pain and vomiting; intense headache; drowsiness and coma, which might last for three or four days. The fatal dose was 1–2 ounces. It had a selective action on the optic nerve, so that the patient who took a large dose, whether it made him drunk or not, usually became blind. Partial recovery might take place after a few days, but was succeeded by permanent loss of sight or a central scotoma. Methyl-alcohol was excreted very slowly; the breath would smell of it for over a week, and even after that time 50 per cent. of the poison would remain unoxydised in the body. Its oxidisation produced formic acid, which might be the cause of the optic neuritis. Methyl-alcohol had been used in many countries as a substitute for ethyl-alcohol, and beverages containing it were most dangerous poisons, for they were taken in the same quantities as if they contained ethyl-alcohol. It was sometimes sold in America as Columbian, Colonial, or Eagle spirit, and essences of ginger and peppermint, bay rum and bitters made with it had caused numerous deaths some years ago. It had also been used to adulterate whisky, brandy, sherry, rum, and cider. Serious epidemics of poisoning had resulted in Germany from brandy containing two-thirds of methyl to one-third of ethyl-alcohol; out of 113 men who had drunk this mixture, 56 had died and 42 had become blind. Roumania had also suffered recently from similar epidemics due to the use of industrial alcohol. These examples proved that the evil was not confined to countries where alcoholic beverages were prohibited

Isopropyl alcohol, or C_3H_7OH, had the same value as ethyl-alcohol in forming the basis of tinctures. It was not taxed, because it did not produce the pleasurable effect of ethyl-alcohol. It was twice as poisonous and induced lethargy, headache, and epigastric pain. Tolerance was established, and the permanent effects were no more harmful than those of ethyl spirit. Allyl alcohol, or $C_5H_{11}OH$, had as its principal constituent, fusel oil, a late product of yeast distillation; it was five times as poisonous as ethyl-alcohol. Contrary to a widespread belief, however, it was not responsible for the effects of the ingestion of bad spirits, as it was present only in minute quantities. The speaker enumerated some of the commoner alcohols and described their formation from hydrocarbons by the substitution of a hydroxyl for an oxygen group.

The PRESIDENT remarked that some three hundred varieties of alcohol were known to chemists; all the forms mentioned by the speaker were pure, and he questioned his use of the term "impure forms of alcohol."

Dr. COURTENAY WEEKS stated that investigations by the United States Government had proved that many of the deaths from spirit drinking were not due to methyl-alcohol, but to the effects of unusually large quantities of ethylic alcohol. Whisky in America might be above proof—i.e., contain more than 57 per cent. of ethyl spirit—and its consumers were liable to treat it as though it contained less than half that proportion. Many deaths reported as due to methylated spirit had occurred before prohibition, and victims of this poison were usually persons who were already vitiated by ethyl-alcohol. Dipsomaniacs would drink all kinds of irritant substances indiscriminately; he quoted a case where one had tried to make a beverage in a saucepan with paint scraped from a door.

Sister EMILY ISABEL mentioned two cases of methylated spirit addiction under her care. One was in a middle-aged woman, who was also a heavy drinker of other forms of alcohol, and had been taking impure methylated spirits for two years because of their cheapness; she was going blind. The other patient had used methylated spirit because it was easier to hide from her husband; her sight was not affected.

Mrs. M. S. DALTON agreed that the cheapness of methylated spirit was an attraction.

Mr. L. A. SENN asked if the Colonial or India Offices analysed the gin shipped from Holland to West Africa, or the foreign brandy imported by India and the Colonies in hundreds of thousands of gallons every year. These spirits must have a very deteriorating effect.

Sir ARTHUR NEWSHOLME remarked that the increased mortality from various causes shown in the statistics from time to time were largely due to "fashions" in nomenclature. The present fashion was arteriosclerosis. The high reported mortality from methylated spirit drinking in America might also be due to a passing phase of public interest in this cause.

Dr. F. W. WILLWAY pleaded for some effort to correct the erroneous idea, fostered by systematic propaganda in the daily press, that prohibition was responsible for indulgence in impure forms of alcohol. All alcohols were poisonous, and it would be of no advantage to remove restrictions on the sale of ethyl-alcohol.

Sir WILLIAM WILLCOX, in reply, agreed that the number of different alcohols was probably infinite. Much of the harmful effect of methylated spirit poisoning was, of course, due to its ethyl-alcohol content. He mentioned the case of a female patient who had been rich enough to afford the finest alcoholic beverages but had preferred methylated spirit—of the pre-war kind—probably because its effects were more intense and prolonged. She had been very neurotic. Another very tragic case was that of a young man who, after one drink of adulterated whisky in America, had developed central scotoma and died of cerebral degeneration.

Reviews and Notices of Books.

UNIVERSITY COLLEGE, LONDON, 1826–1926.

By H. HALE BELLOT, M.A., Reader in Modern History in the University of Manchester. London: University of London Press, Ltd. 1929. With nine statistical charts and other illustrations. Pp. 464. 25*s*.

IT is always of interest and oft-times of importance to trace the way in which great institutions come into being. In cases where the history is ancient, when we endeavour to follow it far back we do not often get behind the stage of firm establishment, and we are able to learn little or nothing of the actual origins; but in institutions of more recent formation we have an opportunity of learning the mode of their birth, and we can trace development year by year until the position which they occupy to-day is reached. So it is with the teaching body which we now call the University College, London, and its offspring the University of London itself.

Sir Thomas Gresham's foundation in the middle of the sixteenth century introduced the idea of a University of London 200 years before the inception of the present University, but from one cause or another it had never borne fruit. It was not until the year 1820 that a real beginning was made, when Thomas Campbell, the brilliant erratic poet, went to Bonn, and there was struck by the mutual tolerance in University circles of protestants and catholics and by the liberal treatment accorded to the Jews; at once the desire for a University for London arose in his mind, which should admit to its privileges and opportunities all who wished to learn without distinction of creed. There can be no doubt that it was Campbell's promulgation of this sentiment that led ultimately to the establishment of the University of London. The older universities had done much splendid work and were doing it; they had changed also in response to the changes in the life and thought of the country, but the work they were doing, excellent though it was, did not fulfil all the needs of the time. The enormous advances in physical science, the changes in many branches of exact knowledge, and the development of new classes in society whose interests differed in many ways from those of the dominating sections of the previous century—all these things had led to a widespread feeling that there was room for drastic alteration in the mode of training those who had to take part in the business of life in every field of activity. Science was not receiving the place in education which its ever-increasing importance in manufactures demanded. But—and it was, of course, the fact of prime importance—in the older universities even that measure of science which was taught, and which was capable of practical application, was not available to that large portion of the population which did not belong to the Established Church. In this respect there were indeed slight differences between the attitudse of Oxford and Cambridge, but at neither University could a degree be obtained by any nonconformist. Thus there was a large body of all denominations anxious to have systematic teaching in many branches of modern learning who were unable in this country to get any university training at all. It was not that in Great Britain there was any lack of modern thought; in Scotland especially much had been done during the latter half of the eighteenth century to advance the cause of modern learning; but the fact remained that the whole country was not benefiting as it should have done from the accumulating stores of knowledge, and this at a time of great material development.

Exactly at this place a great factor in the demand for a modern university in London was furnished by the position of medical education. It was seen to be unreasonable that a London student of medicine should be unable to obtain a degree in London, but be forced to go to Oxford or Cambridge, or to proceed

to other divisions of the Kingdom or abroad. Moreover, though there was an enormous amount of clinical instruction available in London, all the systematic teaching was on the whole ill-organised; for the large number of medical students in London the need for a regular and complete course of medical teaching in London was urgent, and this made obvious the great desirability of the establishment of a university medical faculty in the metropolis. To Campbell must be given the credit of bringing to a head the recognition of this need; the original idea was his, and credit is often given to others which, in part at least, belonged to him. But a large number of progressive and highly educated men resident in London soon came to take part in the attempt to form a metropolitan university, and Campbell was soon joined by, among others, Brougham, Bentham, Grote, Mill, Tooke, Macaulay, Birkbeck, and Goldsmid, who may be taken as typical of those who shared in the work. Ultimately it was resolved to start a joint stock company, and under a deed of settlement it was arranged to raise a capital of not less than £150,000. Sufficient money was received, not without delays and disappointments, to justify the laying of the foundation-stone of University College under the title "London University," and this was done on April 30th, 1827.

Then came the task of appointing the professors. The new Council of the College wished to choose men of high standing, but the fact that the emoluments of the professors had to depend mainly on the fees of the students, while the students had not yet materialised, limited the number of applicants, and many difficulties arose. Of the professors appointed some in nearly every department resigned after a short tenure of office, and the lack of sufficient capital increased greatly the responsibilities of the Council. Of all the departments during the first few years of the life of University College, the most successful by far was that of medicine. In the first session there were 183 medical students, in 1831 there were 252, and in 1834 the number had risen to 390, when the success of the new institution led naturally to imitation by other metropolitan medical schools and the rate of increase fell off. At first the medical students of University College had to seek their clinical knowledge where they could obtain it, but University College Hospital was opened in 1834, and this disability was removed. But Mr. Hale Bellot brings out clearly in his book the anxious time which the College had before it for many years. The establishment of King's College, London, detached many who would otherwise have been students. The Law Society and the Inns of Court established courses of lectures on the various branches of legal study, and this reduced the number of legal students, and the need of a charter to give power to confer degrees was a serious drawback. It was exactly this proposal on the part of the Council that was the cause of the greatest opposition; this came particularly from Oxford and Cambridge and the Royal College of Surgeons of England, and it seems, from physicians and surgeons of the medical schools of London other than the school of University College Hospital. But towards the latter half of 1836 the Government of the day took a hand. Two charters were drafted, by one of which the body hitherto called London University was incorporated as University College, London, while by the other charter an entirely new body was created, to be styled the University of London with the full powers of a university. Thus the long struggle was ended in what was probably the best settlement, despite subsequent history.

It is certain that the stimulating influence of the work done in a University College had an enormous effect on many other teaching bodies in London and elsewhere; it showed them the need that existed for a wide change in the methods of instruction. At first in this way the College warred against its own interests. The excellent example which it set led to a diminution of the number of its students, who went to other educational bodies, which were now granting increased facilities. It was not until the sixties that the fortunes of the College were placed upon a firm basis, but by that time it had become generally recognised that it had achieved and was achieving famous deeds in enlarging the sphere of learning, in removing obstacles which hindered the entry of promising students, and in turning out graduates fit to hold great national positions. Since that time the progress has been continuous. In many departments of learning the College has been a leader, and from its walls many professors have gone out as missionaries of learning to other seats of education. During the hundred years that have passed since its foundation it has done perhaps more than its famous founders expected, while it is entering on its second century stronger than it has ever been.

Mr. Hale Bellot has written a clear and interesting account of the birth and growth of University College, London, and we congratulate him on a literary performance which must have called for an infinitude of labour, as the multiplicity of references and the elaborate statistical tables show, while proving the trouble he has been at to secure accuracy. May we, from a personal point of view, mention one thing? On page 395 it is stated that in 1888 a house at Longcross was left to University College for use as a convalescent home; the house was bequeathed to the College in 1886 by James Wakley, the editor of THE LANCET from 1862 until his death in the year of the bequest.

THE PHYSICS OF X RAY THERAPY.

By W. V. MAYNEORD, M.Sc. London: J. and A. Churchill. 1929. Pp. 177. 10*s.* 6*d.*

THE essential messages of this book concern practical therapeutic X ray measurement, and are introduced by arguments drawn from physics which imply considerable mathematical proficiency; the methods of X ray measurements are discussed, and then the chief results of such measurements are detailed with the effects of varying conditions of irradiation in practice. The problem of the radiologist, viewed from the physical standpoint, is to deliver a certain dose of X rays at a determined depth below the surface, while observing, as far as may be, the distribution of X radiation within a mass of tissue. A clear résumé of the important factors affecting the choice of therapeutic conditions is given and the small book closes with an analysis of the physical principles underlying the construction of the apparatus used in X ray therapy. The author acknowledges in the preface assistance from Kaye's "X Rays," Grossmann's "Physikalische und technische Grundlagen der Röntgentherapie," and Compton's "X Rays and Electrons," and to the first two authors he is indebted for permission to use data from their respective treatises. As an account of some of the physics of X ray therapy the book is of distinct value, and displays its author's intimate knowledge of the subject.

TROPICAL DISEASES.

The Diagnosis and Treatment of Tropical Diseases. Fifth edition. By E. R. STITT, Ph.G., M.D., Rear-Admiral, Medical Corps, U.S. Navy; Graduate, London School of Tropical Medicine. London: H. K. Lewis and Co., Ltd. 1929. Pp. 918. 31*s.* 6*d.*

THOSE who have profited from the earlier editions of this comprehensive book will welcome its development into an imposing octavo volume, fully illustrated with no less than 249 figures. It has now taken a high place amongst the standard works on this subject in any language containing an immense amount of information on many subjects which are not even mentioned in other text-books. The opening chapters on malaria are admirable; the sensible views expressed upon the subject of quinine prophylaxis are backed by an array of facts and figures

great use to the malariologist. In the treatment of sleeping sickness emphasis is laid upon the action of etharsanol and proparsonol, two new arsenical derivatives prepared by W. K. Stratman-Thomas and A. S. Loevenhart. Finality in nomenclature of typical parasites has not been attained, and we have not previously seen the generic term *Borrelia* applied to the blood spirochætes; *Wucheria bancrofti* replaces the time-honoured *Filaria bancrofti*. It must be admitted that the frequent changes in the nomenclature of parasites are a source of confusion to the student and of despair to the teacher, and we trust it will soon become standardised.

In the treatment of relapsing fever the contra-indications for salvarsan therapy are emphasised; these apply equally well to the treatment of syphilis. The discussion upon the nature, chemistry, and therapeutic utility of vitamins is on a broad basis not confined to tropical diseases, and the same may be said of the excellent index of clinical diagnosis. The hygienist and epidemiologist will glean much information of value, not, as far as we are aware, obtainable elsewhere, on anatomical and physiological normals and on the physiology of tropical residence.

So far very good, but the book is so packed with scientific data that practical points in treatment have suffered. This section is not developed in sufficient detail. While most of the illustrations are excellent, future editions would be much enhanced by the inclusion of coloured plates, especially in the section on malaria.

Exotische Krankheiten. Ein Lehrbuch für die Praxis. Second edition. By Prof. Dr. MARTIN MAYER. (From the Institut für Schiffs- und Tropenkrankheiten.) Berlin: Julius Springer. 1929. Pp. 368. M.39.

ALTHOUGH some five years of fertile work have elapsed since the publication of the first edition of this practical handbook, it has been found possible to incorporate the new information without adding largely to its bulk. Zoological and entomological data are supplied with reference to each disease, and no attempt is made to deal with protozoology and helminthology as separate entities. A hæmatological section forms a useful addition. The descriptions are adequate but very brief. The text illustrations, especially those in colour, deserve especial praise. This book is likely to be popular among students of tropical medicine who know German, though the price is high for a manual of this kind.

THE PRACTICE OF PERIODONTIA.

By SIDNEY SORRIN, D.D.S., and S. C. MILLER, D.D.S. New York: The Macmillan Company. Pp. 160. 15*s*.

IN the introductory note by J. McCall and P. Stillman this book is stated to be "a milestone of progress in the control of periodontal disease by the dental profession." So laudatory a statement raises hopes which are damped when we find that the book is an exposition of the thesis that pyorrhœa is chiefly caused by "traumatic occlusion" and that the methods of treatment described are based throughout on the assumption that this hypothesis is correct. The chief protagonists of this particular theory are McCall and Stillman, and while it is not unnatural for them to regard with special favour such enthusiastic disciples as Sorrin and Miller, more impartial testimony to the outstanding merits of the book is still to seek. It is generally admitted that gross deviations from what is usually termed normal occlusion put an excessive stress on the teeth which may so injure the supporting tissues that they become unable to resist infection. There is much clinical observation to support this view, which is by no means a new one. But the advocates of traumatic occlusion as the chief ætiological factor in pyorrhœa go far beyond this. They postulate a rigid standard of arrangement of the teeth as the normal one and every deviation from this, however slight, as being essentially pathological. Furthermore, the existence of pyorrhœa in a mouth is regarded as an implication that the occlusion is traumatic and therefore must be corrected by grinding the teeth or using some prosthetic or other forms of restoration to the "normal." In the chapter labelled physiology it is pointed out, no doubt correctly, that the grooves on the crowns of teeth act as spill-ways which deflect food from the septal tissues and protect the latter from injury. Few would agree that the function of these grooves is so vital that teeth worn flat by attrition should be artificially grooved. The difficulty of accepting their views is that occlusion so far from being fixed, varies throughout life in proportion to the normal wear of the teeth, which brings about a progressive series of modifications in the relationships of the upper and lower teeth. In prehistoric man, among primitive peoples, and even in some individuals of the highly civilised races, attrition sufficient to obliterate the cusps and grooves is a normal feature of adult life. It is a familiar fact that persons whose teeth show well-marked attrition have healthy mouths. Attrition is evidence of vigorous mastication combined with the use of a coarse, detergent diet; and we fail to see any adequate reason for the artificial rejuvenation of the teeth here advocated. Much of the treatment recommended in the book is sound, for it embodies measures practised successfully by dentists all the world over long before the theory of traumatic occlusion was propounded. Those who are prepared to winnow the grain from the chaff will find useful and interesting hints in this book, but its value to the general medical reader is vitiated by its insistence on developing a hypothesis which is fantastic rather than scientific.

ANATOMY AND THE PROBLEM OF BEHAVIOUR.

By G. E. COGHILL, Wistar Institute of Anatomy and Biology, Philadelphia. Lectures delivered at University College, London. London: Cambridge University Press. 1929. Pp. 113. 7*s*. 6*d*.

THESE lectures concern the study of the growth of behaviour in the light of the development of the nervous system. The work on which they are based was carried out almost exclusively on amblystoma, which afforded excellent material for this kind of study. While psychologists view the problem of behaviour from the more or less philosophical angle, it is rather the objective attitude that has prompted the line of research in this investigation. Dr. Coghill has observed the gradual unfolding of amblystoma in order to follow the changes in the structure of the nervous system pari passu with the appearance and acquirement of full function of the limbs. The study of the relation between movements of the limbs and those of the trunk is essentially the study of one of the most important activities of the organism, that of locomotion. How far correspondence of behaviour to neural structure satisfies all the peculiarities of organic life is open to grave doubt, but there are good methodological reasons for supposing correspondence between neural events or patterns and behaviour. The discovery of the Rohan Beard cells linking up proprioceptive with exteroceptive mechanisms helps to explain that strange integrity of inner and outer events which make up the associations in the higher or psychic life of the organism. The demonstration of the growth potentiality of this system does something to check the apparently victorious march of behaviourism into neurological territory and thence into psychology. The conception of continued growth in this Rohan Beard system allows for the possibility "that such a progressive differentiation of sensitivity may be the essential constitution of the conditioning process." Hence the study of these growth potentials assigns a limit to crude behaviourism, and the impulse of growth which Dr. Coghill's researches have led him to invoke, becomes inventor and operator to the organism.

JOURNALS.

AMERICAN REVIEW OF TUBERCULOSIS, Vol. XIX. (Nos. 4–6).—*April.*—Two studies on Pulmonary Acoustics are contributed by P. F. Metildi and R. S. Lyman, and R. R. Hannon and R. S. Lyman.—Stephen J. Maher illustrates an article on Some Sources of Acid-Fast Bacilli with a series of coloured plates. Acid-fasts are forms of ordinary bacteria which have developed waxy capsules to resist an unfavourable environment. They frequently accompany cancerous growths. These are distinguished from tubercle bacilli by their action in curdling and reddening litmus milk.—Frederick L. Hoffman writes on Cancer of the Lungs. The increase in this form of malignant disease is real and is probably connected with atmospheric pollution due to modern development of road transport. Neither smoking, effects of gas poisoning nor the influenza pandemic appear to have influenced the spread of the disease nor has any direct connexion between pulmonary tuberculosis and malignant lung disease been established.—Everett K. Geer, F. F. Callahan, and D. Greth Gardiner describe their experience in the use of Iodised Oil in Pulmonary Tuberculosis. The supraglottic method is recommended in order to avoid trauma to mucous membrane in frequent contact with tubercle bacilli. Injections are of value in defining fistula tracts, outlining tuberculous empyema cavities, determining the pulmonary condition when thoracoplasty is under consideration and in revealing slight degrees of bronchiectasis, as the source of unexplained hæmoptysis.

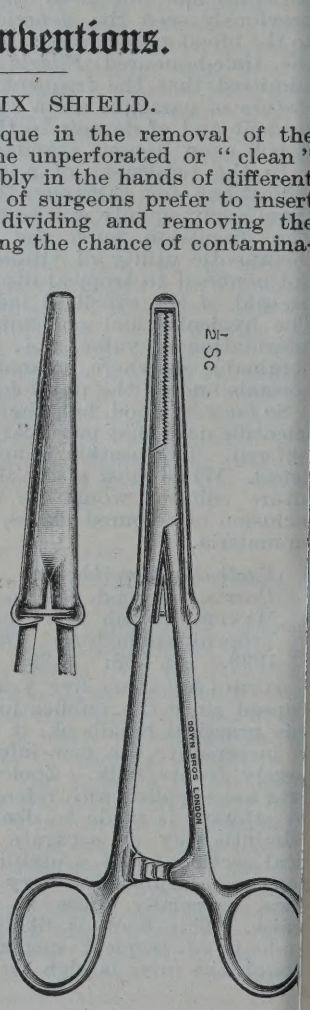
May.—Edgar Sydenstricker discusses the Trend of Tuberculosis Mortality in Rural and Urban Areas. That of the former was essentially identical with that of the latter during the period 1900–15, but since the world war the net effect of the interplay of various factors upon the tuberculosis death-rate has been to favour a somewhat greater decline in cities than in country districts.—Ralph R. Mellon and Elizabeth L. Jost describe experiments on the filtrability of the granular phase of the tubercle bacillus.—A. Levinson contributes a Study of Pulmonary Tuberculosis in Children. Cases may be classified as (1) generalised miliary tuberculosis, (2) acute tuberculous pneumonia, and (3) subacute or chronic pulmonary disease. While most of the cases in the last group are of the adult type, reference is also made to chronic tuberculous broncho-pneumonia in infancy and to the so-called epituberculosis of Eliasberg and Neuland. The tuberculin test was negative in all cases of miliary tuberculosis.—Richard H. Miller and William M. Shedden deprecate the modern tendency to exclude operative measures from the treatment of tuberculous cervical adenitis. While recognising the value of hygiene, heliotherapy and X rays they consider that tuberculous lymph glands constitute foci from which disease may spread at any time and prove a source of grave danger. Radical surgical operation is the method of choice in a considerable number of cases in both adults and children.

June.—A. Calmette and Harry Plotz contribute a leading article on Preventive Inoculation against Tuberculosis with the Bacillus Calmette-Guérin in which they vigorously controvert the opinion that the B.C.G. vaccine is dangerous.—Adolph L. Gallant describes the results of the treatment of syphilis in tuberculous patients. A positive Wassermann reaction was obtained in 21 per cent. of hospital patients suffering from pulmonary tuberculosis. Treatment of the syphilis resulted in marked amelioration of the symptoms of tuberculosis, and a significant reduction in the death-rate of the treated cases. In the presence of tuberculosis the dose of arsenicals should be reduced to half or one-third of the usual dose.—Benjamin Goldberg gives an account of the Chicago antituberculosis scheme. The most noteworthy regulation is one which makes it illegal for a child to share the home of a consumptive.—Theses by J. Dwight Davis and Maude L. Lindsey are concerned with obliterative changes of the pulmonary lymph vessels in tuberculosis and reactions of the subcutaneous connective tissue to experimental tuberculosis in the guinea-pig.

New Inventions.

APPENDIX SHIELD.

THE details of technique in the removal of the appendix, particularly the unperforated or "clean" appendix, vary considerably in the hands of different surgeons. The majority of surgeons prefer to insert the purse-string before dividing and removing the appendix, thereby reducing the chance of contamination of the peritoneal cavity to a minimum. Others make a practice of removing the appendix before inserting the purse-string; this makes matters more simple since the offending organ has not to be held up out of the way, but it has the grave disadvantage that it is impossible to be sure that the suture will not fall across the appendix stump and become contaminated. This danger can be obviated by fitting a shield or sheath over the blades of the Mayo-Ochsner forceps (see figure), grasping the stump of the appendix immediately the latter has been removed. Rowlands and Turner state that it is unnecessary to ligature the stump of the appendix provided it be crushed by a strong forceps for some moments before being covered over by the purse-string. The steps of the operation would then be as follows: The meso-appendix is ligatured and divided right down to the base of the appendix. The appendix is then grasped at its base by a Mayo-Ochsner forceps which is closed tightly. A second forceps is placed on the distal side of the first and as near to it as possible. The two forceps are then laid side by side on a piece of gauze and the appendix divided between them, close to the first forceps. The appendix is removed, the piece of gauze thrown away, and the stump of the appendix lightly touched with a swab which is thereupon thrown away. The appendix shield is now clipped over the blades of the Mayo-Ochsner forceps on the appendix stump. The purse-string suture is inserted, the shield and forceps removed and laid aside, and the operation concluded in the usual way. If for any reason the base of the appendix is divided before the meso-appendix, two shields may be used.



The shield is made by Messrs. Down Bros., Ltd., 21 and 23, St. Thomas-street, London, S.E.

Derby. A. ERNEST SAWDAY, F.R.C.S. Edin.

REBUILDING OF ST. BARTHOLOMEW'S HOSPITAL.—Lord Stanmore, the treasurer, states that the hospital can no longer meet the demands upon it, and that it must be enlarged, modernised, and partly rebuilt. The present wards were built nearly 200 years ago, and it is intended to launch an appeal for money in the early autumn.

THE LANCET.

LONDON: SATURDAY, JULY 20, 1929.

THE MENTALLY DEFECTIVE ADULT.

THE missing section of the report of the Mental Deficiency Committee has now appeared.[1] It will be remembered that Part III. of the Special Committee's report dealing with the adult defective was ready for publication when the rest of the report appeared in April,[2] but was held over for consideration by the Board of Control and the Ministry of Health. Conjecture had it that the delayed section of the report was too strong meat for the populace on the eve of a general election, or alternatively that it contained proposals for the sterilisation of the adult defective of a kind too drastic for promulgation at such a time. As we had good reason to surmise,[3] neither conjecture is realised in the report before us. Far from providing an easy solution of the social problem of mental defect, the Committee believe that the legal sanction of sterilisation would simply enhance the difficulty of bringing defectives within the scope of existing measures for control. We print on another page the few well-considered remarks in which the Committee convey this result of their investigation. The real thrill is contained not in this part of the report, but in the survey made by Dr. E. O. LEWIS and his assistants which appeared in April. This was the discovery that there are in this country some two and a half to three times as many defectives as are known to or being dealt with by the proper authorities. Their estimates were made by applying the figures of a local survey, with appropriate corrections, to the country as a whole. The resulting total was twice as high as that of the Royal Commission of 1906, and no doubt much of the excess is due to better ascertainment. There are now more welfare agencies of all kinds than there were, and with the rising standard of living the defective becomes more obvious. Mental defectives are finding more and more difficulty in getting work owing to the enforcement of trade-union standards, of workmen's compensation, of employers' liability, and of health insurance, obligations which make the employer more chary of taking on a defective individual. Thrown out of the labour market they come on the poor-law, and so into public notice. What real increase there may be is more marked in the country areas; the better and more energetic stock forsake the isolated villages, leaving behind a poorer stock to breed from. More inquiry is desirable in order to ascertain whether this holds good generally.

Having now answered to the best of their ability the two questions: How many defective persons are there, and what is the best thing to do with them? the Committee propose a third and very pertinent question: Are there any means of lessening the burden of mental defect? For this purpose they distinguish between primary and secondary amentia. The latter presents the simpler problem. Secondary amentia is usually of a low grade and is distributed with some uniformity throughout all social classes. Few secondary aments are likely to mate; girls, it is true, might be exposed to some danger if not cared for, but so far as is known secondary amentia is non-heritable. Moreover with improved midwifery, with the increase in antenatal and V.D. centres, and with the growth of infant welfare and school clinics most of the causes of secondary amentia are being dealt with. Primary amentia, on the other hand, occurs as a family and group problem; it is unevenly distributed in the population, the majority of the cases coming from the lowest tenth in the social and cultural scale. Part of the incidence depends on the germinal variation which occurs in all classes, a variation which is as likely to be in both directions as one only. Genius and defect may be found in the same family; as is well known, the Jewish race provides both much genius and much defect. If this is so, sterilisation would be liable to remove the assets as well as the liabilities of the race. In the main, however, primary amentia is an end-product of continuous poor breeding and deterioration of stocks. Relatively few are the children of certifiable defectives, many come from poor stocks in which there are all forms of social inefficients. In part it may be a cultural problem, for as culture rises, and with it the standard of living, fewer are willing to produce children for whom they can provide nothing. Cultural rise, moreover, seems to some extent to sublimate the sex instinct, and, as education penetrates, the birth-rate of the several classes will tend to approximate.

In education, then, the Committee see the chief hope of betterment. Of the effect of sterilisation on any particular group too little is yet known, while there is the risk of diverting public opinion from providing the needful institutions, for sterilisation does not render its object stable, employable, or amenable. Many, too, would hesitate to notify or certify the defective if his act might lead to a maiming operation. The greatest thing of all is to catch the defective young, to train him manually and in character, and to introduce him gradually to the world under efficient supervision. Much relief is given to defectives under the poor-law, but many who are now sent to institutions could remain at home if some small additional support were available. The Committee would make it legal to pay sums for maintenance of defectives under supervision, and would simplify the rules of guardianship which at present are so minatory as to frighten off the relatives. Though the distinction between mental deficiency and insanity may be useful in administration, both have environmental stresses especially in early life which need study. Out-patient and guidance clinics may do much to check the individual causes of degeneration. As all these things need correlating the Committee suggest that the time is coming, if it has not already come, to appoint a medical officer of mental health to survey all preventive measures from the mental standpoint as does the medical officer of health from the physical. Whether he should be attached to the health service, or to a separate mental service, is left open. Logically he would stand to the superintendents of mental hospitals or certified institutions in the same relation as the medical officer of health to the superintendents of sanatoriums or fever hospitals—and under the new régime of general hospitals. His task would be the even wider one of correlating all influences for good mental health.

[1] Part III. The Adult Defective. H.M. Stationery Office. Pp. 102. 1s. 6d.
[2] See THE LANCET, 1929, i., 930.
[3] Ibid., p. 1044.

CORPORA TRIVIALIA.

THE appalling increase in motoring casualties has consequences for the hospitals and the medical profession which call for immediate remedy. Etymologically, it appears, those things are trivial which are met with at the cross-roads,—things common-place, ordinary and familiar. Trivial enough, in this sense only, are the traffic accidents which happen either where three ways meet or elsewhere upon our roads to-day. A Home Office return shows 156,024 persons killed or injured by road accidents in England and Wales during 1928; this total, representing an average of over 460 cases a day, is 12 per cent. higher than that of the previous year. This is not a trivial matter for the hospitals, some of which report that the expense to which they are thereby put runs into thousands of pounds a year, with nothing but negligible contributions from the injured persons to set against it.

Nor is it a trivial matter for the medical practitioner who gives skilled attention in some sudden emergency and too frequently receives neither payment nor even thanks. Recent discussions in the *Manchester Guardian*[1] have revealed that in one instance a practitioner attended as many as 13 cases without receiving any kind of fee. The circumstances, of course, are unfavourable to the normal arrangements for charge and payment. There is a general atmosphere of sympathy; the condition of the patient may prevent his making an offer of immediate remuneration, or a contract to pay; he is often a stranger to the neighbourhood, and the casual helpers who accompany him can hardly be expected to emulate the Good Samaritan by making an immediate financial deposit and promising further payment at their next visit. Liability for the accident may be hotly disputed; insurance companies may be vaguely relied upon; perhaps most frequently of all, there is a general impression that treatment for accident injuries is a gratuitous public service—something which it is the duty of the police or other authorities to provide. So the very mention of charges for professional service is invidious as well as ultimately unavailing. Persons who can afford their own motor-car manage to evade payment, and the motor-cyclist (as common experience shows) is often neither insured against accidents nor worth the cost of suing for the recovery of a fee. Meanwhile the practitioner may have given an hour of his time to dressing an awkward cut or setting a fracture; there may be anxious relatives to interview and ambulances to be arranged for; bandages and even drugs may have been furnished, and domestic servants will have extra work in cleaning up the mess. The practitioner gives no less care to the *corpus triviale* than to his other patients. If his surgery adjoins a high road, the routine of his Sundays —if not of his weekdays as well—is upset by this new significance of the "trivial round and common task." Why, as a county court judge asked recently, should the doctor be expected to give his services for nothing? The medical profession is not the only one to make sacrifices in service of the poor; the legal profession does the same. But it would possibly occasion some surprise in legal circles if the sabbath quiet of a solicitor's home were invaded by a procession of injured persons requiring their dying declarations to be taken, or their last wills and testaments to be drawn up, without prospect of fee or even of any expression of gratitude.

The absence of an obvious remedy is no reason for acquiescence in the present state of affairs. In one small way the police can help by furnishing the doctor with the name and address of the patient he has treated. Larger proposals have two objects to achieve. In the first place some comprehensive system of first-aid ought to be evolved by the official and unofficial bodies concerned, the local authorities, the police and those associations which coöperate in the managing of traffic while promoting the interests of the motorist. The Order of St. John of Jerusalem has already done splendid work in organising its home ambulance service for the transport of accident cases; it is also engaged in preparing specifications for first-aid huts suitable for erection by the roadside, to be equipped to minimise the consequences of injuries. If the traffic casualties continue to increase, we may require the Royal Army Medical Corps to work out schemes of dressing stations and field hospitals. In the second place there is the financial difficulty to be tackled. Decent folk will be ashamed to trade upon the gratuitous services of the hospitals and the medical profession. Police authorities can incur expense in connexion with ambulance work; it may be necessary to extend their powers. In any case the treatment of traffic casualties is as much a part of the traffic problem as the maintenance of road surfaces, the planting of trees, or the removal of blind corners. The Road Fund is rightly employed to minimise the risk of accidents; why is it not also available to minimise the consequences of accidents? A fraction of its millions would go far to pay for the care of the victims. Proposals have been made in Parliament that no one should be licensed to take a motor-car or motor-cycle upon the roads unless he first produces evidence that he is adequately insured against third party risks. If present conditions continue, such legislation is inevitable. The companies through which certain newspapers insure their subscribers must have obtained useful data and experience. Can they produce a comprehensive scheme, or must it be left to the State to evolve from its imperfectly coördinated arrangements for workmen's compensation, health and unemployment insurance, and old age and contributory pensions, a universal all-in system, which will cover accidents also?

[1] See THE LANCET, pp. 50 and 85.

THE CHILDLESS MARRIAGE.

To gain more control over the processes of reproduction so that he may prevent the birth of the unwanted and secure that of the desired child has long been the aim of civilised man. Towards the realisation of both of these objects he has made great strides, but he has still far to go. Sterility, whether it be that of the male or of the female, is a condition that more often than not defies treatment, and as a result we find that some 10 per cent. of marriages remain involuntarily childless. As Miss F. M. HUXLEY makes clear in her article on the treatment of sterility in women (see p. 138) the treatment of childlessness, if it is to have any chance of success, must rest on an exact diagnosis, and it is in this direction rather than in the discovery of any new therapeutic weapons that progress is at present being made. In the female the use of insufflation of the tubes or of lipiodol injections allows of a precision in diagnosis that was formerly unattainable. In the male a similar exactness has for many years been possible by ordinary urological methods of examination. But even here progress has been made by the method of spermatozoon counts introduced by Dr. D. MACOMBER and Dr. M. B. SANDERS. These observers have found that healthy semen contains about one

hundred million spermatozoa per cubic millimetre. This figure is remarkably constant for all normal men below the age of 40. Above that age the spermatozoon count tends to fall. In abnormal cases the figure may be reduced to anything from sixty million down to complete azoöspermia. An examination of a large series of cases revealed the fact that in only four instances had a pregnancy resulted when the count had been below sixty million. A spermatozoon count furnishes therefore useful information in diagnosis and prognosis as well as a guide to the effect of treatment.

Another advance that has been made in recent years is the recognition of the part played by diminished fertility in childlessness. If one of the partners in a marriage be highly fertile a relative sterility of the other may be fully compensated. If, however, both be below par childlessness may result even although examination proves neither to be sterile. It is, indeed, probable that in a very large number of childless marriages multiple factors are at work, factors that affect not one but both of the persons concerned. The problem is more complex than was formerly supposed, and in order to discover an answer numerous causes of sterility must be considered, both local and constitutional. The local conditions that effect fertility, such as inflammation of the genital tract, have long been known; the constitutional factors are only now being recognised. They are summarised in the paper read last year before the British Medical Association by Mr. KENNETH WALKER and in the excellent article by Dr. S. R. MEAKER published in the *Journal of the American Medical Association* (May 4th, 1929.) For the sake of convenience these constitutional factors in sterility may be divided into four groups—namely, those due to endocrine disorders, chronic intoxications, metabolic faults of extrinsic origin, and conditions of general debility. Of endocrine disorders that affect fecundity the commonest are those of the pituitary and thyroid. As an instance of the sensitiveness of the gonads to chronic intoxications and especially to intoxications of microbial origin, may be cited KYRLE'S statement to the effect that it is hardly possible to find a normal testicle in adults who have died of infective diseases. The rôle played by faults in metabolism and by diet has been emphasised by the work of many different observers, amongst the first of whom were C. B. PAUL, T. B. OSBORNE, and L. B. MENDEL. These workers found that rats brought up on a restricted diet that was sufficient to permit of their normal development remained sterile. To the unknown vitamins in which their diet was deficient they applied the letter E. Observations on the effect of food on fertility have also been made by veterinary surgeons, who have long recognised that dogs fed on cooked meat and biscuits become sterile. Amongst the states of debility that carry with them a low fecundity may be mentioned anæmia and severe neurasthenia.

Some day our methods of examination may become still more exact, so that we shall be in a position to express the fertility of a marriage in figures. This fertility index will be arrived at by multiplying together those of the husband and of the wife. The estimation of the fecundity index of the male is almost within our reach, but that of the female presents difficulties that are at present insuperable. It is interesting to speculate on the way that the problem of the childless marriage will be treated in the future. Some indication is given by the clinics already established on the other side of the Atlantic. At present these clinics are concerned mainly with diagnosis and prognosis, both partners in the childless marriage being subjected to a searching examination not only of the genital tract, but also of their general health, metabolism, endocrine balance, and mode of life. The factors responsible for the diminished fertility are diligently sought out, and as far as possible remedied. But as is so often the case diagnosis in sterility is ahead of treatment and too frequently conditions are found for which no remedies are at present available. In the future it may be otherwise. The time may come when those who intend to procreate children will voluntarily embark upon a régime calculated to raise to its zenith their general physical and reproductive efficiency. The dictum of AUGUST WEISMANN, that the germ cells remain unaffected by changes elsewhere in the body, may cease to be given the literal translation accorded to it to-day. It is not easy to believe that whilst the number of spermatozoa secreted is influenced by states of health their quality is unaffected. Although we have no proof that such is the case, on theoretical grounds it would seem probable that the death of a fertilised ovum is sometimes due to a fault in the male cell rather than in the female. If this be so, and if the cause of such a miscarriage is to be remedied, we shall be forced to increase the range of our treatment and to include within its scope the care of the spermatozoon as well as that of the ovum.

THE PLACE OF SURGERY IN EXOPHTHALMIC GOITRE.

BOTH physicians and surgeons achieve results in the treatment of Graves's disease, but as the condition is further studied and the mass of reliable clinical records increases it becomes more and more clear that the patient's prospects are improved by a close alliance between them. Cure would probably be commoner if treatment were based on an exact knowledge of the cause, but this is at present unknown. If, as was once supposed, Graves's disease were due to a simple over-activity of the thyroid gland the problem would be simpler, but it is now recognised that in this form of goitre the thyroid secretion is in some way altered and made toxic, as well as being increased in amount. The primary mechanism of this alteration and increase of secretion is not understood, although R. J. LUDFORD and W. CRAMER[1] have shown that there is a difference in the mechanism of secretion in the normal gland and in that of exophthalmic goitre. C. W. CRILE[2] has lately brought forward evidence in support of the theory that suprarenal over-activity is also an important factor, and that the acute crisis of hyperthyroidism are related to over-activity of these glands. Meanwhile, lacking more information, we can recognise numerous predisposing causes of the disease. Thus, acute infections, focal sepsis, shock or prolonged worry and heredity are factors of importance in many case-histories, and the disease occurs ten times more frequently in the female sex.

The fact that the normal course of exophthalmic goitre is extremely variable leads to difficulty in estimating the value of different forms of treatment. Probably half the patients eventually get well with or without treatment after varying periods of chronic ill-health, while the remainder go intermittently down hill until after long periods of invalidism they are carried off by intercurrent disease or cardiac failure,

[1] Proc. Roy. Soc. B., 1928, civ., 28. (See THE LANCET, 1928, ii., 712.)

[2] Bruxelles Méd., July 7th, p. 1002.

or die suddenly in the throes of thyroid crisis. But in spite of this difficulty almost everyone would agree that treatment should begin with the eradication of septic foci, and with the patient's removal to surroundings where mental and physical strain are reduced to a minimum, and rest can be obtained. Once these conditions are secured symptomatic treatment would naturally be given; a sufficiency of sleep would be maintained by sedative drugs such as quinine hydrobromide, and the patient would receive a diet unlikely to stimulate the already raised metabolism, but sufficient to meet the increased energy requirement. So much is pretty generally accepted. Often, however, measures of this kind are inadequate, and it is then that the problem of surgical treatment arises. During the last ten years thyroid surgery has made rapid strides on both sides of the Atlantic. Its progress was assisted by the observation of D. MARINE and LENHART that small doses of iodine or potassium iodide, previously taboo in hyperthyroid conditions, produced an artificial remission of the disease. H. S. PLUMMER and W. M. BOOTHBY, working at the Mayo Clinic, then began to use iodine extensively in the form of Lugol's solution as a means of preparing patients for operation, and found that by so doing they were able to prevent the disastrous thyroid crisis, which in the earlier days were the cause of so many deaths at, or shortly after operation. This discovery, coupled with a steady improvement in surgical technique, now makes it possible to review the results of many hundreds of scientifically recorded cases treated by partial thyroidectomy, and to consider the part which surgery should play in treatment. CRILE, for instance, has recently reviewed over 10,000 cases of hyperthyroidism treated surgically; a week or two ago we published[3] a summary of F. H. LAHEY'S deductions from the study of the results of 6700 goitre operations, of which 4000 were for Graves's disease or toxic adenoma; whilst in our present issue appears a paper by Mr. W. H. C. ROMANIS, in which he reviews his operative results in a smaller series of 500 consecutive cases. These three observers agree about the great value of surgical treatment. ROMANIS applies the term Graves's disease to cases in which, besides the usual signs of thyroid toxæmia, there is definite enlargement of the heart and definite changes in the eyes. He divides his cases into primary and secondary, the latter being those in which a thyroid toxæmia supervenes on a parenchymatous goitre or toxic adenoma of many years' standing, in which type there is a particular liability to auricular fibrillation. This type is the one referred to by most American authors as toxic adenoma. CRILE, LAHEY, and ROMANIS are at one about the importance of iodine medication before operation without distinction between the two types, although LAHEY says that the beneficial effects of iodine are less obvious in toxic adenoma. As regards the amount of tissue to be removed at operation, all three writers admit a difficulty. They agree that it should usually be considerably more than half the gland and that occasionally a further portion may have to be taken away at a second operation. CRILE and LAHEY both record a mortality of less than 1 per cent., and ROMANIS a mortality of 2 per cent. LAHEY gives a separate quotation for a series of 200 cases of toxic adenomata with auricular fibrillation of which only three died. ROMANIS, though he does not quote separate figures, agrees with both other observers in emphasising the great value of partial thyroidectomy in thyrotoxic fibrillation. All speak of rapidly beneficial effects from surgery, both CRILE and ROMANIS emphasising the need for removal of enough thyroid tissue if the best results are to be obtained. When this is done ROMANIS considers that most patients can return to a normal life within six months although, especially in long-standing cases, a pulse-rate of 80–90, and some exophthalmos, often persist.

So striking a consensus of opinion from American and English sources cannot fail to impress those who are doubtful about the part surgery should play in the treatment of hyperthyroidism. For what are the alternatives? There is the wait-and-see policy, which, from the nature of the disease, will often justify itself; and there is local treatment of the gland with radium or X rays. Both these methods yield a high proportion of partial and complete cures, but it is doubtful whether in primary Graves's disease the risks of these more conservative measures are not greater than the risks of operation, whilst in the secondary type operation is certainly the treatment of choice, and should be done before auricular fibrillation has had time to develop. In the absence of a true cure the objections to surgery, or to any other treatment which aims at partially destroying the thyroid gland, are mainly theoretical. These objections are that exophthalmic goitre is due to an unknown stimulus affecting the whole gland, so that however much is removed the stimulus to the remaining portion remains, and a low-grade form of the disease is likely to persist or recur; that there is no accurate way of estimating the amount of gland which should be resected in each case; and finally, that removal of the greater part of a gland so important as the thyroid is unsound as a means of re-establishing its normal physiological action. The problem, of course, is so much an individual one in every case that it is difficult to dogmatise. From a consideration of the results of thyroid surgery for the last few years, it does, however, seem that if medical measures fail, partial and sufficient thyroidectomy by experienced thyroid surgeons offers the sufferer from Graves's disease her best chance of certain and speedy recovery to the extent of being able to live a normal life.

[3] THE LANCET, July 6th, p. 30.

THE KING.

THE clear and detailed bulletins which have been issued during the week have alike informed and reassured the public in regard to the health of the King. It being known that there was a residual abscess communicating with the surface by an oblique sinus increasingly difficult to keep patent, steps were taken to accurately localise the abscess by a radiological examination after the injection of lipiodol. Stereoscopic pictures were taken at Buckingham Palace and these were closely examined and their implications discussed by Sir Stanley Hewett, Sir Hugh Rigby, Mr. Wilfred Trotter, Mr. Martyn, and Lord Dawson on Tuesday, July 9th. After a further consultation the next day the nature of the operation was agreed upon. This operation was performed by Sir Hugh Rigby and Mr. Wilfred Trotter, after which the following bulletin was issued on July 15th.

The operation on His Majesty the King has been performed.

Portions of two ribs were removed, in order that the circumscribed abscess, 1½ in. across, should be directly drained and treated.

The condition of His Majesty is satisfactory.

STANLEY HEWETT. FRANCIS E. SHIPWAY.
HUGH M. RIGBY. DAWSON OF PENN.
WILFRED TROTTER.

As His Majesty has now acquired a high degree of general immunity, there is every prospect that the abscess cavity will steadily progress towards healing.

Annotations.

"Ne quid nimis."

SEAMEN'S HOSPITAL SOCIETY.

THE week has seen another milestone passed in the adventurous career of the Seamen's Hospital Society, for on Monday last the Duke and Duchess of York declared open the new pathological laboratories built to the design of Sir Edwin Cooper, which are to serve the needs not only of the Seamen's Hospital itself but of the whole neighbourhood in which it lies. Another building opened at the same time was the nurses' home, situated within the gardens of the Royal Hospital School, which is to provide a separate room for each of the 130 nurses who staff the "Dreadnought" itself and its local extensions. The capital cost of both buildings has been fully met out of the fund raised by Viscount Devonport, in 1915 and after, as a lasting memorial to the work of the mercantile marine, and there is a small balance for maintenance. Not as large certainly as some of the optimists on the staff would like. Responding at the banquet to the toast of the laboratories proposed by Lord Devonport himself, the dean, Mr. Percival Cole, spoke of their double function in supplying the known needs of the moment and in organising research to meet the unknown needs of the future; and Prof. R. T. Hewlett, who was in the chair, pictured the endowment of research scholarships as the next objective in view. The scheme has in fact come to fruition at an opportune time. Even in their previous domicile the laboratories, under the joint direction of Prof. Hewlett and Dr. Arthur Davies, had served the health departments of five London boroughs and the neighbouring poor-law hospitals. The new unit is fit to play an integral part in any new organisation of a local health service if only for the remarkable faith shown by the promoters of a great fund in allotting it to the development of pathology rather than to the provision of beds or clinics. Sir John Rose Bradford, in giving eloquent expression at the banquet to this feeling, was but echoing what was no doubt in the minds of many of his listeners, and his remarks were endorsed by the Member of Parliament for Greenwich who, while disclaiming knowledge of pathology or of the sea, said he knew something of human values at the Seamen's Hospital. It must not be assumed by those who do not know all the facts that the "Dreadnought" is now nothing more nor less than a school of pathology. Since 1901 when, according to Prof. Hewlett, the palæolithic period in the Society's history came to an end, the hospitals for sick and injured merchant seamen under the auspices of the Society have increased remarkably in size and number; there are now 627 beds in the seven establishments, including the sanatorium at Bramshott and the hospital at Marseilles. The point is rather that pathological research has always been a tradition in the Society—was it not at Greenwich that one of the first cases of acromegaly was described?—and that this tradition is now assured full scope in its further development.

RETROPHARYNGEAL ABSCESS IN INFANTS AND CHILDREN.

ALTHOUGH retropharyngeal abscess is not common, its recognition is important owing to the risks attending spontaneous rupture. According to Greenwald and Messeloff[1] the majority of cases occur during the first year of life, and it is just at this time that an adequate examination of the throat is difficult. Inspiratory and expiratory stridor, aggravated by the horizontal position, is, of course, the outstanding symptom, but diagnosis should usually be possible before it becomes the presenting symptom. A previous history of acute nasopharyngitis is the rule, and in any case in which this is followed by restlessness and unilateral enlargement of the cervical glands, the question of a retropharyngeal abscess should arise. Owing to difficulty in swallowing, mucus collects in the throat and causes the rattling and stertorous breathing so often heard in the later stages. A snoring, gurgling respiration during sleep is, in fact, one of the most constant symptoms. Further, the younger the patient and the more rapid the course of events, the more pronounced are these findings. Torticollis is nearly always found, and its presence should suggest retropharyngeal abscess before anything else. As Greenwald and Messeloff point out, the examiner must have a clear conception of a normal throat in infants and children in order to determine, from his brief glance, whether or not there are pathological changes. Even then inspection of the throat in infants is rarely conclusive, and should be followed in all suspicious cases by palpation with the finger. In older children, difficulty is encountered in the examination because of trismus. The pushing forward of one faucial pillar is an outstanding sign found on inspection and one that may easily be overlooked. Slight œdema of the soft palate may also be seen in some cases. The mucosa covering the swelling is at first red, and later, when there is suppuration, the redness fades and the pharyngeal wall becomes pale and somewhat yellowish, feeling elastic and boggy to the finger. Once an abscess has formed, surgical measures and evacuation of the pus are obviously indicated, but in the stage of lymphadenitis, before true suppuration, great harm may be done by incision, because generalised sepsis may follow. In Greenwald and Messeloff's opinion, the best results are obtained under light ether anæsthesia, unless the child is desperately ill; the outlook as a rule is excellent.

[1] Greenwald, H. M., and Messeloff, C. R.: Amer. Jour. Med. Sci., June, 1929, p. 767.

THE TRAFFIC IN DANGEROUS DRUGS.

THE third annual report made by the British Government to the League of Nations respecting the traffic in opium and other dangerous drugs is now available. It would appear that while the administration of the Dangerous Drugs Acts, 1920 to 1925, seems to have given effect to the principles implied in The Hague and Geneva Conventions, and to have greatly restricted illicit procedures in Great Britain, there is abundant evidence of vigorous illicit commerce elsewhere. Reports of seizures have during 1928 been received from the colonies and the Dominions, in particular India and Canada, from the United States, as well as (through the Secretariat of the League) from other countries, notably Egypt and China.

The total amount of morphine and its salts manufactured in Great Britain, by the two Edinburgh firms licensed for the purpose, was 69,021 ounces, a further reduction on the previous year. Likewise the amount exported from Great Britain, 49,824 ounces, was greatly less than obtained only a few years ago. Of this exported morphine, 7058 ounces went to Asiatic Countries and 2749 ounces found their way to China, an increase of 1831 ounces over the previous year. The exports of British morphine to Africa, America and Australasia also show an increase over the figures for 1927, while the consignments to European countries showed a considerable decrease. Of heroin (diacetyl morphine) 10,794 ounces were manufactured in Great Britain, of which 6038 ounces were exported. It is interesting to note that Indian opium is now almost entirely employed in this country for pharmaceutical purposes to the exclusion of Persian and Turkish opium, which latter were formerly regarded as the more appropriate sources of the alkaloids. It is also to be noted that in addition to the import of raw opium 9647 ounces of crude morphine

were imported from India (presumably from the Government factory) and used for the production of the alkaloid or its salts. No less than 64,091 ounces of morphine were last year used for the making of codeine, an alkaloid not at present included within the provisions of the Hague or the Geneva Conventions. A novel departure has been made whereby 4934 ounces of cocaine were manufactured last year for the first time in this country by the one firm (May and Baker, Battersea) licensed for this purpose. The imports of cocaine (9353 ounces) were less by 6000 ounces than in 1927. On the other hand the exports of cocaine salts (3950 ounces) showed an increase on the previous year, such increased exports being chiefly to China and New Zealand. The exports of heroin (diacetylmorphine), generally speaking, show a similar tendency, while in the case of "artificially dried opium" there was a curiously large increase in the consignments to South Africa—viz., a total of 195,000 lb. or an excess over the figures for 1927 of 88,428 lb.

From press reports it would appear that in more than one case the diplomatic privilege which secures immunity from search to consignments of goods to embassies and legations has been abused by the inclusion of dangerous drugs. Meanwhile the Permanent Central Opium Board has held its second session at Geneva. The relation of that body to the Advisory Committee on Traffic in Opium remains somewhat indefinite, though close coöperation is naturally deemed to be essential. The Board nominated certain officers for the secretariat and these await the approval of the Council and the Secretary General of the League. After prescribing the forms of statistical returns of import and export of the scheduled drugs the Board adjourned till October.

VARIOLA IN RABBITS.

THE variolous origin of vaccinia is now generally accepted as a fact and anyone familiar with the correct technique has no difficulty in producing a strain of vaccinia by passing the virus of small-pox through an appropriate series of animals. An important difference between small-pox and the disease produced by the virus thus modified consists of the inability of the latter to spread from one individual to another by any means other than actual inoculation of virulent material. So far as we are aware the disease in animals other than man has always shown this absence of infectivity, and if this characteristic can be taken as the distinction between variola and vaccinia an outbreak among laboratory rabbits described by S. Nicolau and L. Kopciowska[1] fully merits the name of variola.

The epizoötic occurred in April of this year among some 50 rabbits in a room where there had been no animal infected with vaccinia since the previous September. Two animals undergoing antirabic immunisation developed simultaneously a peculiar form of acute coryza, with purulent nasal discharge, later becoming sanguineous with the formation of blackish crusts round the nares. Respiration was difficult owing to the nasal obstruction and the animals died on the fifth and eleventh days respectively. Each rabbit showed three or four small papules on a previously shaved area on the flank. Within 40 days symptoms of the illness had appeared in 34 other rabbits housed in cages in the same room, which measured approximately 26 feet by 60 feet. The symptoms varied and out of 23 which died six had acute coryza, two acute coryza and cutaneous papules, eight coryza and conjunctivitis or kerato-conjunctivitis, one of these having orchitis in addition, one kerato-conjunctivitis alone, three orchitis, and three showed no definite symptoms. Of these last three one on dissection was found to have a pustule on the nasal mucous membrane, and several of those with coryza had one or more pustules on the tongue. Orchitis did not occur among the rabbits which recovered, but otherwise their symptoms were similar. Post mortem all the dead animals were found to have a greatly enlarged spleen. Purulent pneumonia was found among those which had shown coryza before death, and the meninges were frequently adherent, a condition typical of cerebral vaccinia. These adhesions were more marked in the rabbits which had shown no definite symptoms while alive, suggesting a special localisation of the virus in the brain in these cases. The skin papules were typical of the lesions of vaccinia. Out of 12 attempts the virus was successfully recovered every time from the tissues of rabbits which died in the epizoötic, nine times from the brain, twice from cutaneous papules or pustules, and once from the testis. This virus proved highly virulent for rabbits, killing with the typical signs of vaccinia in four to six days when introduced into the testis or brain, and on skin inoculation producing a characteristic eruption intermediate between that of neurovaccine and dermovaccine. Cross-immunity experiments demonstrated the variolous or vaccinal nature of the virus. Animals immunised with ordinary vaccine were completely resistant to the virus from the epizoötic both with cutaneous and subdural application. Likewise the animals which recovered were refractory to ordinary vaccine. Moreover, a number of rabbits which had been through the epizoötic without showing symptoms also proved to be immune to ordinary vaccine.

The authors of the paper have nothing definite to suggest as to how the infection arose or was disseminated beyond vague speculations as to the possibility of its having been latent in the dust of the room for seven months and been carried by air and dust. It is noticeable that no mention is made of the possibility of its importation and spread by the attendants of the animals. It is suggested that seasonal influences played a part, mainly on the grounds apparently that the outbreak coincided with the "recrudescence of the epidemic of human small-pox observed particularly in England"—a recrudescence which actually consisted of a comparatively small number of imported cases of a virulent type which achieved a disproportionate international prominence.

The interest in the outbreak reported by Nicolau and his colleague seems to lie in the virulence and infectivity of an outbreak among rabbits. Vaccinia among rabbits and other animals is generally regarded as a mild and comparatively innocuous disease which can be relied on to breed true to type—a fact of which advantage is sometimes taken in the preparation of vaccine used for protective purposes.

[1] Comp. rend. de la Soc. de Biol., 1929, ci., 551–555.

THE TAVISTOCK CLINIC.

THE problem of functional nervous disorder is becoming increasingly important. It is dealt with to a certain extent in consulting practice, but many thousands of patients with limited means have no one to cater for them. The Tavistock-square Clinic is making heroic efforts to fill a gap many times larger than its utmost capacity. Its work has increased by 30 per cent. in two and a half years, and the activities of the Children's Department by no less than 57 per cent. in one year. Its services are in ever-increasing demand among hospitals, police-courts, and private patients who cannot afford a consultant. The Clinic has now, however, reached saturation point. Its work is carried on by 25 regular physicians, and in only seven consulting rooms, and every part of the building is utilised to the utmost. The result is that the waiting list has twice had to be closed in the last 18 months. These limitations have produced what Dr. H. Crichton Miller calls "very active compensatory phantasies of extension." The phantasies, however, are of a constructive kind, and are embodied in a

well-developed scheme. Mental hygiene, as he points out, can no longer be considered as the fad of a handful of men and women. In all countries where it has been systematically practised it has proved as necessary and valuable to the health of the community as the work of stamping out tuberculosis, cancer, or infantile mortality. The extension scheme has been worked out in such a way that it can be realised step by step as the necessary funds are subscribed. The first need is for an institution where treatment, teaching, and research can be conducted on a scale more approaching the needs of the country. The building will cost £80,000, and its endowment another £100,000. Observation homes for mal-adjusted children will cost £20,000. The most urgent necessity, however, and one which is hampering the work of the Clinic at the moment, is for a hostel for patients who cannot afford nursing homes, and are not well enough to stay in cheap lodgings and hotels. The hostel proposed will house 20 patients, and will cost £13,000; when once established, it will be almost self-supporting. It may be noted that the appointment of a Deputy Director of the Clinic, Dr. J. D. Rees, at the beginning of the year, which was made possible by an anonymous donation, has resulted in an immediate improvement in the coördination of the staff. New activities have been initiated in every branch of the work, and especially a system of record-keeping which will facilitate treatment, administration, and research. The Clinic is, therefore, prepared for further expansion, and it remains for those who appreciate its importance to give it the financial assistance which it is well-adapted to transmute into mental efficiency and happiness.

DENGUE IN ATHENS.

THE clinical aspects of the Athens epidemic of dengue[1] were minutely studied, but no account of them has hitherto been available. We therefore welcome a recent report[2] by physicians who had immediate access to over 1000 cases. In October, 1927, the disease suddenly made its appearance in the city, but the outbreak was a small one and was extinguished in November. In mid-June of 1928 a few sporadic cases were noted, and the infection spread so quickly that towards the end of September quite nine-tenths of the population were attacked. In the Piraeus, which has direct communication with Athens, dengue was disseminated more rapidly than elsewhere. The election of August 19th and the constant interchange of population between capital and provinces which this entailed during the summer season all contributed towards its propagation.

Amongst the prodromata of dengue slight headache and otherwise inexplicable fatigue are noted. In the invasion period the muscles of the eye are implicated, the patient suffering especially on lateral movement. The joints are generally painful. The fever rises gradually, sometimes with a rigor; a temperature of 104° or 105° F. may be recorded. In the invasion period the pulse-temperature ratio is normal. Pains in the body become intense, so that every movement is accompanied by great difficulty. In the Athens epidemic the gastric phenomena were remarkable. Nausea usually accompanied the primary rise of fever, but the straining at vomit was so intense as often to rupture small arterioles in the palate, pharynx, or tonsils, with effusion of blood into the vomit. The primary eruption was characterised by hyperæmia of the face and neck, and suffusion of the conjunctiva. This reddening was sometimes so slight that it escaped detection and in 10 per cent. of the cases no primary eruption was noted. The febrile illness was occasionally over within four or five days, and though in certain cases fever lasted as long as 23 days, in 85 per cent. it ended within six days by a typical crisis lasting 3–6 hours. Intense headache usually persisted for some 36 hours after the fall of temperature. As a rule there was a fall of temperature on the third day, accompanied by a sense of well-being, and this lull might last for 36 hours; afterwards, however, the temperature soon began to rise until it had reached its former maximum. The second crisis may take place on the fourth, fifth, seventh, or even the ninth day; or the fever may end by lysis. After the first drop of temperature bradycardia becomes noticeable, and these observers say they have often recorded a pulse of 70 with a temperature of 104° F. Not only is there a great slowing of the pulse, but also a fall in pulse tension. A secondary eruption was a pretty constant feature, usually appearing on the second or third day after the decline of fever. It might be roseolar, morbilliform, scarlatiniform, or even petechial. The exanthem itself lasted 12–36 hours and in disappearing was accompanied by furfuraceous desquamation. Examination of the blood revealed a constant leucopenia; a count of 3000 leucocytes was common and occasionally it was only 1500. The mononuclear element was increased to 30–50 per cent. of the total. Convalescence was marked by debility, emaciation, loss of appetite and taste, and relapses were rare (5 per cent.). In a relapse the exanthematous eruption, pain and bradycardia are all repeated. Usually an attack of dengue provides an absolute immunity, but very rarely it may be repeated two or even three times, as was especially noted in the case of refugees from Asia Minor.

Unfortunately the Athens epidemic has added little to our knowledge of treatment. The authors of this report are convinced that neither the salicylates nor urotropine, whether given by the mouth or intravenously, have any decided specific effect. In their protocols they record seven deaths, of which the direct cause is attributed to dengue, but post-mortem examination was not obtained.

[1] Clinical Study of the Dengue Epidemic in Athens during the Summer of 1928. By Apostolides, Ch., Chaniotis, N., Hadjissarantos, D., and Frankiadakis, G. Paris Méd., May 11th, 1929.

[2] See THE LANCET, 1928, ii., 454.

THE NEW PHARMACOLOGICAL LABORATORIES IN MANCHESTER.

ON Wednesday of last week, Mr. F. H. Carr, late President of the Society of Chemical Industry, opened the new laboratories which Messrs. Benger's Food, Ltd., have presented to the Medical School of Manchester University. The new laboratories are for the study of pharmacology, pharmaceutical chemistry, and biochemistry in its relation to pharmacology. They consist of a room suitably equipped for experimentation on animals and man, with a preparation room attached, a biochemical laboratory, a pharmaceutical laboratory with separate balance and furnace rooms, a demonstration theatre to accommodate some 50 students, private laboratories for the head of the department and a lecturer, and a room to be used as a library and secretary's room. There are three small rooms near by in which animals can be housed under ideal conditions. This extension has been rendered possible, firstly through the removal of the department of pathology to York-place, where it is in more immediate contact with clinical work and the related departments of bacteriology and public health, and secondly through the generous donation of £2000 in memory of Frederick Baden Benger. This was the Benger who coöperated with Sir William Roberts in the eighties of last century in the production of an efficient pancreatic extract. Roberts described it in his Lumleian lectures as "an almost faultless pharmaceutical preparation with high diastatic and proteolytic properties of the gland in a highly concentrated degree." Other digestive products were subsequently put on the market to meet Roberts's wishes. The study of pharmaceutical

chemistry in Manchester goes back a good many years, the first systematic course having been given in 1824 by John Dalton, F.R.S., then president of the Literary and Philosophical Society. The lectures, about 15 in the course, were given in the evenings at seven o'clock, and Dalton, after explaining the first principles of chemistry, proceeded to apply them to investigations respecting the materia medica, and to other medical purposes. The items on his printed syllabus were these: Heat or Caloric, Constitution of Bodies, Chemical Syntheses and Analyses, Simple or Elementary Gases, Elementary Solids, Compound Bodies, Alkalies, Acids, &c., Earths, Sulphurets, Metals, Vegetable Kingdom, and Animal Kingdom. Dalton received fees totalling £27 8*s.* 9*d.*, from which he had to deduct his expenses which amounted to £10 10*s.* It seems that he maintained his connexion with the medical school for at least six sessions, and that towards the end he had three separate classes, each attended by eight or nine students. The pharmacological department at Manchester owes its present efficient condition to the influence, material support, and devotion of the late Prof. D. J. Leech, who organised and fully equipped it for its needs in 1884, and in whose memory a departmental library was built up. He endowed the Leech chair of materia medica and therapeutics which he held himself for some years, and in which he was succeeded by Prof. R. B. Wild, who retired in 1927. Since then the chair has not been filled but a readership is held by Dr. A. D. Macdonald. It is hoped that the present scheme will provide a modest beginning out of which may grow a school of pharmacology and pharmaceutical chemistry, comparable in its influence to the other schools of the University.

DAMPNESS IN HOUSES.

THAT damp is a potent source of illness is a traditional belief in support of which more and more evidence is slowly accumulating. The proof is all the more difficult in view of the fact that the influence of damp, or more correctly of cold damp air, can be neutralised by adequate clothing, by exercise and to a limited extent by diet. Careful investigation into the housing conditions of children suffering from acute rheumatism led Dr. R. A. Miller to the conclusions that nearly two-thirds of those children lived in damp rooms. Largely at his instance the Science Committee of the British Medical Association asked the Royal Institute of British Architects for assistance in investigating the reasons for dampness in houses, with a view to a plan of action for its prevention. The Institute, having addressed a questionaire to medical officers of health throughout the country, have now considered the replies and published the result.[1] In new houses, that is, houses less than ten years old, porosity or faulty construction of the walls has been found to be the principal cause of dampness; rain beating against a wall with a strong wind blowing or capillary action causes the penetration of moisture to the interior. Attempts to make walls impermeable by cement coverings often fail owing to the development of shrinkage cracks; the true remedy is a cavity wall. There has been a post-war tendency to cut down the overhang of the eaves, a potent device for keeping external walls dry. A curious fact elicited by the inquiry is the absence of damp-courses in new dwellings and defects in those provided, conditions which call for the stricter supervision of the process of building and the prohibition of the use of ineffectual damp-course materials; these might well be subject to standard specification. Dampness arises in a number of cases from failure to cover the whole of the surface of the ground within the building with concrete; if damp is present, as from rise in the level of the subsoil water, a layer of hard broken material must be interposed between the concrete and the soil in order to obtain a completely dry floor. In older buildings the chief causes of dampness are the absence of a damp-course and inadequate maintenance, especially of roofs and rain-water gutters. Sufficient care is not taken to secure a thoroughly waterproof roof; often the pitch is unsuitable; pantiles or interlocking tiles of unsatisfactory manufacture have been used or flat tiles and slates with perishable nails or inadequate overlap. Roofing tiles could, with advantage, be standardised. Another source of damp is defective cement fillets used to fill up intervals between roofs and walls; cracks often develop in these fillets owing to the shrinkage of the mortar or the roof timbers. Walls cannot be protected by bedding tiles in mortar; capillarity comes into action. Condensation on internal walls is of some import in older houses; the construction of the house must allow of the wall being rapidly heated up. Certain amendments to public health legislation are necessary, it seems, to provide a complete safeguard so far as resistance to the penetration of damp into buildings is concerned; the building by-laws as they now stand do not suffice. It is noteworthy that this valuable report, issued after much labour and research and of far more importance than its length would indicate, has been rendered possible by the coöperation of clinical physicians, medical officers of health, and of architects.

[1] Report on Damp Houses. Prepared by a Subcommittee of the Science Standing Committee. London: Royal Institute of British Architects, 9, Conduit-street, W.1. March, 1929. 6*d.*

THEFTS FROM DOCTORS' CARS.

AN industrious member of Parliament has been drawing the Home Secretary's attention to the thefts of drugs from medical practitioners' motor-cars. Supplementary questions invited Mr. Clynes to suggest to "the medical fraternity" that, if these losses continue, "some method will have to be adopted of enforcing penalties"; was he not aware that criminal negligence on the part of miners and railwaymen was invariably punished with imprisonment? The Home Secretary replied with perfect propriety that such thefts had occurred, that the police regarded them as unconnected with the drug traffic, and that it was desirable that the medical profession should do its utmost to minimise the danger. Yielding to the torrent of "supplementaries," he added that, if this publicity were not sufficient warning, "further steps might be taken." To the member of Parliament who put the questions the remedy is simple—a one-clause Bill for the more frequent imprisonment of doctors for criminal negligence. Be it therefore enacted that on and after the first of April any person whose goods are stolen shall, if he be a registered medical practitioner, be guilty of felony, and sentenced to penal servitude. The law already forbids cars to be locked when left at parking-places. An amendment to compel the equipment of medical motor-cars with barbed wire and machine-guns would rightly be ruled out as too militaristic for this peaceful age. Marked economies in police administration will follow by adopting the convenient principle of arresting the owner, rather than the thief or receiver, of goods that have been stolen. One point remains, which can easily be settled on the committee stage of the Bill. Will it be an aggravation of the crime—or will it, on the other hand, be a good defence—if, as sometimes happens, not only the contents of the doctor's car are stolen, but the whole car, contents and all?

SULPHUR AND SALICYLATES IN ACUTE RHEUMATISM.

EXCEPT at spas, the therapeutic use of sulphur has not received very much attention in this country, but in France and elsewhere on the continent this element is employed in colloidal form with increasing frequency. Thus two French workers[1] have lately

[1] Marchal, G., and Thiolat, P., Monde Méd., June 15th, p. 681.

described its successful use in a case of severe cardiac rheumatism which had proved completely resistant to salicylates. The patient was a woman of 24 who had suffered twice previously from acute articular rheumatism without any cardiac involvement. Her third attack began with a sore-throat followed by acutely painful swelling of the joints, and despite the administration of about 90 grains of sodium salicylate daily by the mouth she had developed signs of gross cardiac failure within ten weeks. Intravenous injections of sodium salicylate in glucose had little effect upon this condition, but some amelioration of symptoms was obtained by substituting intravenous injections of colloidal sulphur, the dose being gradually worked up from 0·25 to 2 c.cm. daily. The patient's condition became worse again, so sodium salicylate was recommenced, this time in conjunction with the sulphur. From this moment improvement set in and slowly but surely the patient recovered, so that she was able to return to work nearly eight months after the beginning of her illness. The case is also recorded of a boy of 17, who developed a severe pericarditis in the course of his first attack of acute articular rheumatism. Here again the malady was very resistant to medication by salicylates, but the addition of colloidal sulphur intravenously quickly brought about a cessation of the acute rheumatic manifestations. Leoper and Vahram, who experimented with sulphur in acute articular rheumatism in 1915, are quoted as giving guarded opinions about its employment when cardiac complications are present; they uttered a special warning against injecting sulphur into the veins in the course of a bout of acute endocarditis. Marchal and Thiolat, however, believe that with care there is no danger in its use; it does not even cause the sclerosis of veins which may lead to difficulty when intravenous salicylate is given repeatedly. The exact action of the sulphur is still, of course, in dispute. It has been held that it has a purely local action in the neighbourhood of joints where there is a veritable shortage of sulphur, but its apparent success in cardiac rheumatism, when employed with salicylates, suggests that this hypothesis is not a complete explanation. Marchal and his collaborator hold that it is upon the infective process that sulphur exerts its influence, probably by producing some metabolic change. They say that the action of mercury and of bismuth may be accentuated and that large doses may be given without danger if sulphur is employed at the same time, and they think it possible that sulphur plays the part of a catalyst in promoting the action of salicylates on rheumatism.

MEDICO-LEGAL PROBLEMS.

Lord Riddell, the newly elected President of the Medico-Legal Society, has usefully brought together in one volume[1] his papers read before that body in recent years on such topics as the legal responsibility of the surgeon, the ethical, legal, and medical aspects of abortion, the law and ethics of medical confidences, and the question of sterilising the unfit. The standpoint is that of an observer, himself well acquainted with the medical as well as the legal view, who sees new problems created by developments in surgery and other sciences and by the quickened popular interest in racial and social concerns. Prof. Gilbert Murray lately remarked, in an address to the Hellenic Society, upon the shaking of the intimate beliefs, philosophies, and standards of modern man, the rejection of Christianity by Russia and of Islam by Turkey, the collapse of Victorian ethics and cosmology, and the developments in physical science and psychology. "Impulses hitherto deemed unspeakably obscene or malignant have not only been recognised as part of the human make-up but have received a quite disproportionate welcome from the public." There is all the more need of a calm statement of modern professional practice and its legal aspects in such matters as the "Medico-Legal Problems" with which Lord Riddell deals. If the law requires to be changed to keep pace with present conditions, the public must be educated. Lunacy and mental deficiency, says Lord Riddell, are unpleasant subjects which most people are loth to face or discuss; his chapter on sterilisation focuses attention on the results of shirking a well-considered policy; the central and local authorities concentrate, he says, upon individual treatment without due regard to the interests of the community. Abortion, hitherto a matter for masculine ecclesiastics, lawyers, and doctors, he regards as mainly a question for women, though he deprecates the view of some German writers that every woman, by virtue of her right over her own body, is entitled to decide whether the fœtus shall become an independent human being. Of sterilisation as a means of birth control he expresses no ethical estimate, but desires to see the subject "ventilated and not left exclusively in the hands of the high priests of obstetrics and gynæcology and their prompting and consenting patients." Mr. Justice McCardie has lately been saying at Birmingham Assizes that the public must face the question of sterilisation: it is terrible, he says, that we cannot prevent a woman bringing eight or ten children into the world cursed with the taint of mental deficiency. If people are to face these questions, a well-equipped observer can perform a great public service by setting forth the facts and tendencies clearly and impartially. In this task Lord Riddell has achieved an unquestionable success.

[1] Medico-Legal Problems. London: H. K. Lewis and Co. 1929. Pp. 100. 5s.

TRAINING IN HOSPITAL DIETETICS.

ABOUT five years ago the managers of the Royal Infirmary of Edinburgh equipped and staffed a special department for dietetic work. At first the work was confined to out-patients, but later assistance was sought for patients in hospital, mainly in surgical wards and special departments. More recently two small wards of six beds each have been opened in connexion with the new clinical laboratory, in order that controlled metabolic observations may be possible. The dietetic staff closely coöperate in these investigations. For the past two years special instruction and experience in dietetics has been offered to nurses who have finished their general training. In addition a six months' course for pupil dietitians has now been instituted. Candidates for this require to have had a preliminary training of two or three years in domestic economy and the chemistry of foods in order to benefit from the course. Instruction is given in dietetic work of all kinds, including the calculation and construction of dietaries for all types of metabolic disease and for research purposes. Experience in the preparation of foods is also available. The course is thoroughly practical and those who have taken it have readily found opportunity of making use of their special knowledge.

THE SHORTAGE OF WATER.

A MEMORANDUM issued by the Ministry of Health to water authorities calls attention to the shortage arising from the abnormally low rainfall and discusses the provision of supplementary supplies from neighbouring authorities where there is a local shortage. If existing supplies cannot readily be supplemented, all reasonable measures should be taken early, even at some inconvenience to the consumer, to conserve them. The need for drastic economy and for the detection and prevention of remediable waste is urged. Intermittence of domestic supply is not recommended except in cases of actual necessity. There is always some risk of contamination where pipes are not fully watertight or for other reasons the influx of impure water is possible. In

any sustained dry period the risk of pollution is enhanced, and must be kept under close observation. Wherever the purity of the water is threatened, special means of purification should be undertaken. The readiest of these is chlorination, which should be employed only under expert supervision. Properly chlorinated, water which ordinarily could not be used without some danger to health may be safely put into service, and some water authorities may have to resort to such supplies in order to meet the present emergency. Where general measures of purification are not practicable, if any serious danger of pollution is ascertained, the individual householders should be impressed with the need for boiling the water used by them.

Where expense has to be incurred by a local authority in relieving water shortage in their district County Councils and Rural District Councils are empowered, under sections of the Local Government Act, 1929, to contribute to the expenditure.

THE B.M.A. MEETING.

THE ninety-seventh annual meeting of the British Medical Association opens at Manchester to-day (Friday) with the first session of the Representative Body, which again meets under the chairmanship of Dr. C. O. Hawthorne. A strenuous four days' work is anticipated by the representatives, and the agenda contains subjects lending themselves to almost unlimited discussion, including a national maternity service, a specialist refraction service, the relation of the general practitioner to hospitals and the public health service, and such topical matters as the licensing of motor drivers before their accidents and the care of their injuries afterwards. At the annual general meeting, on Tuesday next, the new President, Prof. A. H. Burgess of Manchester, will be invested with the badge of office and the President-elect for 1930, Prof. Harvey Smith of Winnipeg, will be introduced to the meeting. The scientific sessions begin their deliberations, as usual, on the Wednesday morning. A popular lecture on Frogs and Men will be given by Prof. A. V. Hill, F.R.S., on Friday, the 26th, and the following day will be taken up by an excursion to Colwyn Bay. The annual exhibition will be on view from Monday afternoon until Friday.

INDEX TO "THE LANCET," VOL. I., 1929.

THE Index and Title-page to Vol. I., 1929, which was completed with the issue of June 29th, is now in preparation. A copy will be sent gratis to subscribers on receipt of a post-card addressed to the Manager of THE LANCET, 1, Bedford-street, Strand, W.C. 2. Subscribers who have not already indicated their desire to receive Indexes regularly as published should do so now.

DONATIONS AND BEQUESTS.—Dr. H. T. George, of Hampstead and Cardiff, left £1000 to St. Bartholomew's Hospital and £100 to St. Dunstan's Hostel for the Blind.—Mr. Edwin Brough, of Hastings, left £1000 to the East Sussex Hospital.

THE OSLER CLUB.—A meeting of the Osler Club was held in the evening of July 12th to celebrate the eightieth anniversary of Sir William Osler's birthday. Sir Archibald Garrod delivered the Oslerian Oration which marks these annual occasions; his subject was the Power of Personality, as exemplified in the teaching and practice of medicine by Osler. A discussion followed, which was opened by Dr. A. G. Gibson, and joined in by Dr. G. Feine, Prof. F. R. Fraser, and others. A selection of Osler's writings on Medical Education was displayed, and many messages were read which had been received from friends and corresponding members of the Club abroad. Among those present were Sir D'Arcy Power, Sir William Hale-White, Sir F. G. Kenyon, Dr. Andrew Balfour, Mr. Hugh Cairns, Mr. Philip Franklin, Dr. Marshall Fulton, Mr. R. H. Hill, Dr. Gerald Horner, Mr. Muirhead Little, Dr. J. D. Rolleston, and Mr. Paterson Ross.

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

CCXCV.—THE TREATMENT OF STERILITY IN WOMEN.

PART I.—GENERAL CONSIDERATIONS.[1]

THE questions of sterility on the one hand and that of over-fecundity on the other seriously affect the lives of women of all classes. The doctor is consulted with almost equal insistency on the problems of how to acquire the wished-for child, at almost any cost, and of how to avoid acquiring another child for a time at least.

Diagnosis of the Cause of Sterility.

In dealing with sterility, every effort must be made to diagnose with exactitude the underlying cause or causes before any treatment is initiated. Cases of "functional" sterility become fewer as methods of diagnosis improve. Treatment of a woman should not be started, even when an obvious lesion exists, without proof that her partner is normal. Until comparatively recently the question of male sterility was not seriously considered. It is still usually the woman who seeks advice, though I notice a growing tendency among my patients to come with a history that their husband has been examined and found normal. It is, generally speaking, easier to deal with the male side of sterility in private practice than among hospital patients. Clinical facilities for the necessary examinations and tests are not great in hospital, and under the conditions that do exist the patient has diffidence in voicing his requirements.

Examination of the husband may be direct or indirect. Direct examination involves, as well as history-taking and examination for any physical disability which might interfere with fruitful intercourse, the microscopic examination of the semen for active spermatozoa. Indirect knowledge of the husband's condition with complete knowledge of the wife's reception can be obtained in positive cases by microscopic examination of specimens from the cervix uteri taken within two to three hours of normal coitus. If active spermatozoa are found, the search for the cause or causes of sterility are much narrowed down. If impotence exists in the presence of living spermatozoa, artificial insemination can be tried (see below), but should not be undertaken until the woman has been examined and treated for any lesion which might prevent a successful issue.

Investigation of the History.

At a woman patient's first visit, attention should be paid to her general appearance, and guidance as to treatment may be gained from a careful history, the main points being—age; general health, past and present; duration of married life; whether the sterility is primary or secondary (if secondary, details of previous confinements should be given); menstrual history, as regards age of onset, periodicity, and flow; presence of any abdominal pain or vaginal discharge, or of dyspareunia. The incidence of coitus, its frequency and the position taken should be ascertained; also details of any contraceptive measures used in the past. The family history may also be of interest. The reason for obtaining information on most of these points is obvious. Regarding the menses, although we know that pregnancy can and does occur without them, a poor menstrual history is often associated with poor development of the pelvic organs and, especially if the patient is comparatively young, good results can be obtained with treatment directed towards stimulating

[1] Part II., on Local Measures, will appear next week.

development. With regard to dyspareunia, often associated with incomplete coitus, as a cause of sterility, it is surprising how long patients continue to suffer without seeking advice. Material help can be given in some cases regarding the best time for fruitful intercourse, which, in my experience, is the first week after the period. R. Kurzrok recorded two cases recently where Jewish women, misinterpreting the old Talmudic Law, waited consistently for a full fortnight after each period before intercourse took place. When, according to advice, intercourse took place within a week of the onset of flow, both women conceived readily.

It is also important that the wife should be in a positive phase of sexual excitability. Although it is very doubtful whether the cervix actually gapes during orgasm, there can be no doubt that receptivity is increased when the emotion of both parties reaches its height simultaneously.

The use of contraceptives has frequently been cited as a cause of sterility. In view of the very powerful drugs we use in the treatment of cervicitis and infections of the lower part of the genital tract, and failing statistics, my view is that such contraceptives as quinine pessaries can hardly be so seriously culpable. Any device introduced and left in the uterine cavity, such as the gold wish-bone pessary, or caps which fit tightly on to the cervix and hold up the normal secretions are almost certain to produce inflammatory changes and are much to be deprecated.

Position during and after Coitus.

Conception takes place more readily when the cervix is directly inseminated. In its normal position in the posterior fornix this is best obtained by the "normal" position for coitus—the wife lies on her back with the knees flexed and separated. Free access is obtained, energy is in no way restricted, and there is the further advantage that the semen can be retained in the vagina. In patients with lax vagina and mobile uterus there is a tendency for the uterus to fall into the retroflexed position when the thighs and knees are flexed. Such patients after intromission should straighten and adduct the legs. More important than the position during coitus, when the cervix is not well placed, is position after coitus. Semen can be retained in the vagina by contraction of the sphincters and a change into the semi-prone position. Muscular movement can then further aid insemination of the cervix. It is in these cases that a saline or mildly alkaline douche before coitus may further help by retaining the vitality of the spermatozoa, which is soon destroyed in the natural acid medium of the vagina.

Methods of Examination.

This involves a survey of the patient's general development, the condition of her thyroid, her pulse, and so forth, and a detailed local and bimanual examination. Added to these are the methods introduced in the last few years of per uterine insufflation and injection of the Fallopian tubes—methods which have revolutionised our views on cases of sterility. Before these methods of diagnosis were available, the presence of tubal lesions could be determined only by bimanual palpation or suspected from the history associated with minor degrees of pelvic peritonitis. Now conditions of blockage are found when little suspected and their site defined with a view to treatment. In certain cases the method of diagnosis alone has worked a cure.

Uterine Insufflation.—It was in 1920 that Rubin read his first paper on insufflation and not long afterwards S. Forsdike and others were successful in obtaining good results from the injection into the uterus and tubes of a solution opaque to X rays. Now both methods are greatly improved and widely practised. Neither can be used in inflammatory conditions of the tract, when uterine hæmorrhage exists, on account of the risk of air-embolism, or in patients with cardiac or other serious lesions. The insufflation method can be practised without anæsthesia and is indeed only complete under these conditions, because the patient's sensations are of value in diagnosis, localised pain being felt at the site of blockage. The apparatus consists in a cannula that enters the uterus, fitted with an "acorn," which pushes firmly into the external os. Air or gas is driven through the uterus and tubes at a known pressure. Leakage can only be prevented by firm pressure of the acorn into the os, firm traction of the cervix downwards on to the acorn or clamping the cervix on to the cannula. Many patients do not bear this procedure well. If we use anæsthesia for insufflation, it is possible to say only whether the tubes are patent or impermeable. For the anæsthetised patient dilatation is performed and a cannula that fits tightly into the cervix is used.

Injection.—Lipiodol is the fluid of choice for the injection method. Since its presence in the pouch of Douglas has been found by experience to be innocuous, the only disadvantage of this method is the obvious one that X ray apparatus must be available for its practice. In other respects it is essentially more satisfactory than insufflation, the apparatus being simple (a 10 c.cm. serum syringe attached to a cannula with acorn, as described above), leakage obvious, and the results to be seen, rather than to be interpreted. Injection can be done equally successfully with or without anæsthesia according to the requirements of the patient, and a permanent record can be kept of the results obtained.

FRANCES M. HUXLEY, M.D., Ch.B. Manch.,
Surgeon to the South London Hospital for Women.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Capt. B. P. Pick to *Egmont*, for Malta Hospital.

Surg. Comdrs. L. W. Gemmell to *Ganges*, for R.N. Sick Quarters, Shotley; G. H. Hayes to *Pembroke*, for R.N. Hospl. Gt. Yarmouth; J. F. Hayes to *President*, for Recruiting Headquarters; R. F. Quinton to *Defiance*; H. H. Ormsby to *Vernon*; and J. H. McDowall to *Pegasus*.

Surg. Lt.-Comdr. A. W. McRorie to *Medway* and (on commg.).

Surg. Lt. J. K. G. Way to *Ark Royal*.

ROYAL NAVAL VOLUNTEER RESERVE.

Surg. Lt. (D.) C. T. Pomeroy to *Vivid*, for R.N. Barracks, Devonport.

ROYAL ARMY MEDICAL CORPS.

Capts. P. A. Stewart (prov.) and W. C. Mackinnon to be Majs.

ARMY MEDICAL RESERVE OF OFFICERS.

2nd Lt. R. H. Bland, from Gen. List, Inf., to be Lt.

TERRITORIAL ARMY.

Col. J. S. Riddell (late R.A.M.C., T.F., retd.) to be Hon. Col. R.A.M.C. units, 51st (Highland) Div., T.A.

Capt. R. J. W. A. Cushing to be Maj.

C. R. Greene to be Lt.

Supernumerary for service with O.T.C.: Lt. H. S. Allen to be Capt.

TERRITORIAL ARMY RESERVE OF OFFICERS.

Maj. H. G. L. Haynes from Active List, to be Lt.-Col.

Maj. C. Webb-Johnson having attained the age limit relinquishes his commn. and retains his rank.

Lt. A. S. Gough, from Active List (Supern. for serv. with Med. Unit, Univ. of Lond. Contgt., Sen. Div., O.T.C.), to be Lt.

ROYAL AIR FORCE.

AUXILIARY AIR FORCE.

Flying Officer J. S. Jerome, N. 605 (Co. of Warwick) (Bomber) Squadron, to be Flight Lt.

INDIAN MEDICAL SERVICE.

Temp. Capt. Mangharam Rochiram Lalvani relinquishes his temp. commn. and retains his rank.

The undermentioned relinquish their prob. appts.: Lts. W. Walsh and G. J. O'Connor.

Special Articles.

FOURTH IMPERIAL SOCIAL HYGIENE CONGRESS.

THIS Congress, which was organised by the British Social Hygiene Council, was formally opened on July 8th, at Livingstone Hall, Broadway, S.W. 1, by Lord Linlithgow, assisted by Mr. Wedgwood Benn, Secretary of State for India, Mr. A. A. W. H. Ponsonby, for the Dominions Office, the Hon. Sir. Atul Chatterjee, High Commissioner for India, Dr. C. L. Park, representing the High Commissioner for Australia, and Dr. Bernard Myers, representing the High Commissioner for New Zealand.

The League of Red Cross Societies was represented by Dr. C. Lillingston, the Admiralty by Surgeon-Commander Rivaz, and Surgeon-Captain T. B. Shaw, the Air Ministry by Squadron-Leader H. S. C. Starkey, the Board of Education by Dr. R. H. Crowley, the Colonial Office by Dr. D. H. Owen, the Ministry of Health by Col. L. W. Harrison, the War Office by Major C. F. White, the Department of Health for Scotland by Dr. T. F. Dewar, the Welsh Board of Health by Dr. T. W. Wade, the Government of Northern Ireland by Dr. N. C. Patrick. Australia, Canada, India (31 delegates), New Zealand, S. Africa, Barbados, British Guiana, British Honduras, Ceylon, Cyprus, Fiji, the Gold Coast, Malta, Mauritius, Northern Rhodesia, Seychelles, Southern Rhodesia, Straits Settlements, Tanganyika, Uganda and Zanzibar, were all represented. Mr. N. W. Edson represented the American Social Hygiene Association. Among the home organisations represented were, the British Medical Association (Dr. H. Guy Dain and Mr. N. Bishop Harman), and the Central Council for Health Education (Prof. A. Bostock-Hill and Dr. J. Robert Kaye). Many Universities and towns had sent their own representatives.

Reviewing the work of the League of Nations and of the Advisory committee in relation to prostitution, on July 8th, Dame RACHEL CROWDY, Chief of the Social Questions Section of the League of Nations, gave an account of the international situation with regard to the venereal diseases. Her conclusion was, the advocates of attacking the problem of prostitution from the old angle of control and regulation were losing ground every day. Certain countries are introducing, through compulsory treatment, a new kind of regulation, while other countries are ensuring the complete freedom of treatment. It was for the public to choose between the two. The work of the League of Nations in connection with venereal disease was described by Sir George Buchanan and Col. L. W. Harrison, and the work of the International Labour Office in social hygiene by Mr. H. B. Butler.

Venereal Disease in the Navy.

At the afternoon session, Mr. E. B. TURNER in the chair, Surgeon-Commander P. M. RIVAZ described the preventive measures taken against venereal disease in the Navy. He pointed out that, during recent years, there has been a considerable decline in the incidence of all forms of venereal disease, the North American, West Indian and African Stations being exceptions. He added that, as a rule, the further a sailor get from home, the mo re he is liable to contract venereal disease. Most countries visited by the British Navy have licensed brothels under medical supervision which is apt to be carried out in a perfunctory manner. There is very little disease contracted in Malta itself, in contradistinction to the relatively high rate of many other Mediterranean ports. With regard to control, he described the strictly confidential venereal case sheet which follows a man from ship to ship. On it full details as to progress and recommendations as to further treatment are noted. This enables medical officers to ensure that the syphilitic patient, who is half way through his course does nor get overlooked and that the man with a chronic discharge is properly supervised. Men suffering from venereal disease can only be drafted to ships carrying a medical officer. He had been asked to produce some statistics bearing on the efficiency of prophylactic treatment in the Navy, but, though he did offer some figures, he was inclined to regard them as of very doubful value. However, he believed them to show that early disinfection is of value. One of the chief causes of the decline of venereal disease in the Navy was, in his opinion, the lowered alcohol consumption. He had ascertained that, at one large shore establishment, only 28 per cent. of the men drew their rum ration—an indication of the temperance and sobriety of the present-day blue-jacket.

Squadron-Leader H. S. C. STARKEY, representing the Air Ministry, made a brief statement with regard to venereal disease in the Air Force, and Admiral Sir REGINALD TUPPER gave a comprehensive survey of what has been and is being done for the British Merchant Service at home and abroad. Among those who took part in the subsequent discussion was Fleet-Surgeon W. E. HOME, whose remarks clearly showed how much there still remains to be done for the merchant seamen.

Administrative Control in Scotland.

On July 9th, Prof. A. Bostock-Hill in the chair, Dr. T. F. DEWAR, Medical Officer of the Scottish Board of Health, read a paper on the administrative control of the venereal diseases in Scotland. He said that, even to-day, only a relatively small proportion of the cases of venereal disease, whether syphilis or gonorrhœa, receive early, efficient and adequate, or sufficiently prolonged treatment. He was inclined to throw some of the blame for this state of affairs on the medical profession, and to overcome this evil, he said "there seems no measure except to secure that every medical graduate shall have had adequate training in the diagnosis and treatment of the venereal diseases." He gave the following statistics for the years ended May, 1922, and May, 1928, respectively:

In 1921–22 the total number of patients attending the various clinics in Scotland was 22,898. The number of new patients was 12,542, and the total number of attendances was 262,643. In 1927-28, the corresponding figures were, 27,259—16,032—and 442,807, respectively.

Dr. DEWAR also said that there is a general opinion that the incidence of syphilis, as revealed by the attendance of cases alike in early and late stages, has steadily tended to fall from the years 1918 or 1920 to about 1926. Since then it is believed that, for some unknown reason, there has been an increase in the prevalence of this disease. Ophthalmia neonatorum has been so vigorously dealt with in Scotland that, in the last seven years, only ten children have lost all useful vision from this cause. Taking part in the subsequent discussion, Dr. DEWAR assured his listeners that, were Scotland to be given facilities for compulsory measures, those who had to carry them out would take very good care that they were not abused.

The diagnosis and treatment of venereal disease in Wales was the subject of a paper by Dr. T. W. WADE, Medical Officer of the Welsh Board of Health, and the problem of venereal disease in Australia was dealt with by Dr. C. L. PARK, Chief Medical Officer, Australia House. A summary of the venereal disease problem had also been prepared by the Australian Association for fighting venereal disease.

Disinfectant Packets.

In the course of the discussion some interesting figures were quoted by Mrs. C. NEVILLE ROLFE in connexion with the suggestion that the disinfectant packets served out to men in the Army and Navy are of a certain value in preventing venereal disease. These figures, which were compiled by Dr. Querat, and published in *Bulletin de la Societé Française de Prophylaxie Sanitaire et Morale* for July, 1927, were quoted by Mrs. Rolfe "for what they were worth." The French

Army authorities started a mass experiment in 1921, the men of five Army Corps being provided with prophylactic packets, while the men of five other Army Corps were not thus equipped, the conditions being, otherwise, approximately similar. In the Army Corps provided with packets, the incidence of gonorrhœa was reduced from 10·92 per thousand to 7·51—a reduction of 3·41. But, in the case of the Army Corps not thus equipped, the incidence of gonorrhœa per thousand was reduced from 18·70 to 10·30—a reduction of 8·40. A similar difference in favour of the men not provided with packets was observed in the case of syphilis.

Venereal Disease in British Guiana.

During the afternoon Session, Mr. L. S. AMERY, M.P. in the Chair, a paper was read by Dr. B. N. V. BAILEY on venereal disease in British Guiana. As a result of his experience in this country, he was averse from compulsory measures. Of the 13,000 in-patients treated in the Georgetown Hospital during 1927, 915 were reported as suffering from one or other of the venereal diseases, while, of 27,000 out-patients, over 2,600 were so diagnosed, or approximately 8 per cent. of the total number of cases treated. Of the in-patients at the Georgetown Hospital in 1927, as many as 769 suffered from syphilis and only 42 from gonorrhœa. He commented on the remarkable infrequency of organic nervous disease due to syphilis, and he suggested that, in a country where malaria is so profoundly endemic, this disease might have some influence on the development of syphilis of the central nervous system.

Dr. R. E. HOPTON gave an account of the organisation of the anti-venereal disease campaign in Cyprus. He was sent there in 1927 as a venereal disease specialist, and now has the assistance of a fully qualified English bacteriologist.

False Names and Addresses.

During the morning session on July 10th, Mr. SOMERVILLE HASTINGS, M.P., in the Chair, Col. L. W. HARRISON produced some statistics dealing with the frequency with which the patients attending the male section of his department at St. Thomas's Hospital gave false names and addresses. Of 4950 follow-up letters sent to patients on first default in the five-year period, 1924–28, 1280, or between 25 per cent. and 26 per cent. were returned through the Dead Letter Office. Except for 1924, when the percentage was 21, the proportions were very constant, varying only between 26 per cent. and 28 per cent. The percentage of the patients who resumed attendance as a result of this first letter was between 23 per cent. and 24 per cent. and just under 9 per cent. wrote and explained their absence. Of the large remainder of between 42 per cent. and 43 per cent. who did not reply or resume attendance at once, many eventually resumed attendance. In the female section of his department false names and addresses were given very rarely. Discussing the comparative merits of a venereal disease centre, inside or outside of a general hospital, he was inclined to think that this question was subordinate to that of the personality of the staff of such a centre and he remarked on the devastating efficiency with which an unsympathetic member of the staff could empty such a centre. He described in some detail the attractions which he had encouraged in order to make patients less clinic-shy. In the discussion which followed this paper, a speaker from Scotland tempered his praise of Col. Harrison's paper with the suggestion that the compulsory measures which many of the authorities in Scotland would like to see introduced, were, in the long run, likely to prove more effective than the blandishments with which venereal disease workers in England were trying to keep their patients under continuous medical supervision. Answering these and other criticisms, Col. Harrison apologised for having introduced the subject of compulsory versus free treatment, but he confessed to being still an unrepentant advocate of gentle moral suasion, without draconic measures.

Some Figures from India.

In a paper on the venereal diseases in the United Provinces (India), Dr. A. B. SOUSA said that Col. H. Stott had, for one year, carried out the Wassermann test on all the patients coming to the Kasauli Institute for treatment for dog-bite, and had found it positive in about 22 per cent. The incidence of syphilis and gonorrhœa in the adult population of Lucknow was approximately 20 per cent., whereas it was uncommon in the rural areas. While the incidence per thousand of all forms of venereal disease in the Indian troops in Lucknow had fallen from 99 in 1926 to 85 in 1928, the corresponding figures for the British troops in the same area were 160 and 66 respectively—a very much greater decline.

Conclusion.

This Congress has served many useful purposes. It has brought together many of the men who, during the last few years have taken out post-graduate courses, formal or informal, and have carried out and sometimes modified, according to circumstances, in different parts of the world, the system which has been organised at home under Col. Harrison. Many tributes were paid to the British system by those who have attempted to follow its main principles in other lands. The question of the comparative merits of compulsion and freedom was in the air most of the time, and it is probable that many of the delegates have left the Congress with the impression that the choice between the two systems must largely depend on geographical and ethnical factors. In defining the policy of the British Social Hygiene Council, Mrs. NEVILLE ROLFE pointed out that it tries to give expression to the wishes of its constituents, without imposing any arbitrary or oligarchical policy.

THE NATIONAL INSTITUTE FOR THE DEAF.

THE fifth annual meeting of the National Institute for the Deaf was held at the Caxton Hall, Westminster, on July 11th, when Lord Charnwood, the President, occupied the chair. He was supported by Mr. Somerville Hastings, M.P., and Sir Frank Benson. There was a large attendance.

Before the report of the Committee and the accounts for the year were submitted to the meeting for approval, Mr. A. J. Story, the secretary, summarised the history of the National Institute for the Deaf. It commenced its activities, he said, four years ago, before which time, although there were a number of local organisations for promoting the welfare of the deaf, there was no central body whose concern it was to watch over the interests of the deaf and the deafened. The Committee felt that the time had now arrived in the social history of the country to place the case of the deaf persons before the public, taking note of the intellectual, social, industrial, and religious questions which constituted a great problem. There were many indications, he said, that the national conscience was awakening to the gravity of deafness, both as it affected those who suffered from it and the economic interests of the country. The estimate had been made that the annual loss caused by deafness in this country amounted to £7,000,000. An important feature of the report was a reference to the work of the Committee in devising methods for safeguarding the deafened against the disappointment and loss involved in dealing with firms whose only apparent concern for deafness was the extent of their sales. It had been decided to maintain a register of firms and dealers who had agreed to the conditions :—

(1) That each client will be advised on the merits of his case as to whether an electrical or mechanical or no instrument at all is likely to help ;

(2) That, in the event of a client being dissatisfied with the performance of the instrument supplied, the firm or dealer will refund the purchase money, less

10*s.* 6*d.* to cover expenses, if the instrument is returned in good order and condition within four weeks and;

(3) That no call will be made at the home of an inquirer unless at his request;

A number of reliable firms and dealers who conduct their business on these fair conditions had coöperated with the Committee, and no doubt others would be willing to add their names to the register. Deafened persons were strongly advised in their own interests to treat only with those firms and dealers who had agreed to the conditions, and lists would be sent to any inquirer on receipt of postage.

Mr. W. G. Yates the hon. treasurer, submitted the report and accounts for the year 1928-29, stating that although the Committee were able to meet their expenditure during the year, there was only a small balance of £221, so that anxiety was felt regarding current income, which was entirely inadequate to the needs. [The document, which was in circulation in the room, dealt in detail with the work of the Institute and the national organisation of welfare work, reviewed the social and industrial position of the deaf and deafened, and emphasised the imperative need for Government inquiry. A large portion of the report was devoted to the serious matter of the commencing as well as of the higher education of the deaf and the training of teachers of lip-reading. It can be obtained from the Office of the National Institute for the Deaf, 2, Bloomsbury-street, London, W.C.]

Lord Charnwood then moved the adoption of the report and accounts, and referred to the efforts which he had made in the House of Lords, supported by the Duke of Montrose and others, to induce the Government to set up a body for inquiry into the position of the deaf. Although the attitude of the Government at that time was unsympathetic, he hoped that the future would be more promising.

Mr. M. Birley, chairman of the Executive Committee, seconded the adoption of the motion, which was unanimously carried.

Mr. Somerville Hastings, M.P., aural surgeon to the Middlesex Hospital, moved:—

"That having regard to the grave social and industrial hardships caused by deafness in the lives of large numbers of adolescent and adult persons who were born deaf or have become so, and to the fact that no official inquiry into the results (in the terms of improved social and industrial well-being) of large public expenditures in their education has ever been held, this meeting is strongly of opinion that the time has arrived when a complete investigation into the conditions and needs of these deaf and dumb and deafened persons should be made; and, further, that this meeting urgently calls upon the Government to make such an investigation by means of a Departmental Committee, or otherwise, at an early date."

He said that the inquiry into the condition of the deaf was urgently needed and that the right and proper body to make that inquiry was the Government of the country. The question was sometimes asked as to which was the most unfortunate individual, the *wholly* blind or *wholly* deaf. He would not attempt to make a decision, but he was quite sure that the person who was *almost* blind was much less to be pitied than the person who was *almost* deaf. The person who was almost blind could see just enough light to get about without assistance, but the person who was almost deaf was shut off from his friends. There was a peculiar psychology associated with deafness which, apart from the deficiency of hearing, was provocative of much sympathy. The sensation of hearing was, perhaps, evolved by the necessity of the animal to protect itself against its enemies, and the person who lacked that sense lacked a primitive function. There was therefore little surprise, granting the truth of that theory, that the deaf person was very liable to be introspective, to shun his fellows, to be shy and to be morose. Knowing this, a good many of those who, like himself, had to deal with the deaf professionally, advised them to cultivate more than anything else "cheek"—to be pushful. The deaf, particularly the industrial deaf, were handicapped by lack of the qualities of self-assertion throughout their industrial lives. The employer was afraid that the deaf would be more liable to accidents, and he instanced a case which had recently come before his notice in which a skilled engineer had been compelled to take a job as a labourer by reason of becoming deaf, and not only was his work affected, but his consequent moroseness had blighted the amenities of an otherwise happy home. It should be remembered, too, that no one was free from the possibility of becoming deaf. Therefore the condition of the deaf man or woman was one that needed special care, and it was time that the State took notice of the matter. A large proportion of deafness among children was due to middle-ear disease, and, while a good deal of that could be prevented, the State was not doing all that it might do for those below school age. Although the State did do something for the congenitally deaf child, care started too late, as the early years of education were all important—this criticism, he said, did not apply to Scotland. He would like to see complete deafness in children made a notifiable disease, so that the State could know exactly who were the deaf and would be able to deal with them sensibly. As for the adult deaf, the State did nothing for them, and those who had the matter at heart should demand the Government to make an investigation into the condition of the deaf generally, by means of a Departmental Committee or otherwise.

Sir Frank Benson, who seconded, made an earnest plea for sympathy and help for the deaf, a word which he said implied a tragedy. Everything that delayed action and communication of thought delayed the progress of the people and the welfare of the State, and it was up to everybody to see that no efforts suffered from slackness.

The resolution was supported by Mr. Hugh Morrison and carried unanimously.

On the motion of Lady Charnwood, seconded by a member of the audience, the thanks of the meeting were given to those who had served during the past year on the Executive Committee, and the following were elected for the ensuing year: Rev. F. W. G. Gilby and Rev. A. Smith; Sir Harry Stephen; Col. H. S. Ravenhill, C.M.G.; Major F. J. Wegg Prosser; Dr. Chas. Heath and Dr. D. A. H. Moses; Misses H. Davids; M. Hare, B. Nevile, and F. M. Townsend; The Hon. Mrs. John Tennant; Messrs. E. Ayliffe, H. J. Gibbons, W. McDougall, C. F. Mott, S. A. N. Oxley, L. B. Phillips, C. Shaw, and A. W. Taylor.

A vote of thanks to the Chairman terminated the proceedings.

MENTALLY DEFECTIVE ADULTS.

THE QUESTION OF STERILISATION.

In the first instalment[1] of their report the Joint Committee of the Board of Education and the Board of Control discussed briefly the extent to which sterilisation of mentally defective adults in the present generation would reduce the volume of mental deficiency in the next, and came to the conclusion that, even if this measure were rigidly applied to all the mentally defective, the reduction would not be great. The last instalment[2] considers a more cogent ground for advocating sterilisation, namely, that its application would ease the economic burden by enabling defectives who would otherwise have to be permanently segregated in institutions to return to the community with no risk of their becoming parents, and that a number of them could live happily and harmoniously outside institutions. If it could be proved, say the Committee, that sterilisation could safely and profitably be applied even to certain groups or categories of defectives, the question of its adoption would no doubt deserve careful attention.

[1] Report of the Mental Deficiency Committee. Parts I. and II. H.M. Stationery Office. 2*s.*

[2] Same Report. Part III. 1*s.* 6*d.*

American Experience.

The advocates of sterilisation maintain that the method is successfully applied in America. Sterilisation laws have been passed in about twenty American States, and more recently in Alberta, Sweden, and Switzerland; but only in two American States have these laws been enforced on any considerable scale. The reasons generally given by those who have studied the problem in America for the failure to enforce these laws in those States in which they have been enacted, are that public opinion has apparently disapproved of sterilisation on humanitarian grounds: that the question of doubt as to diagnosis and prognosis and the difficulty of drawing the fine line of demarcation between those who should and those who should not be deprived of the power of propagation appear to have served as deterrents in making the decision on a concrete case: that many well-informed persons have opposed sterilisation as tending towards the spread of immorality and venereal disease by giving liberty to the individual together with the assurance of immunity from pregnancy and its consequences; and that the general aspects of the relation of heredity to mental deficiency have served to raise doubt as to how much may be gained by sterilisation.

The evidence available in regard to the results achieved in California, where the first sterilisation law was passed in 1909, is far from conclusive. So far as it goes it tends to show that sterilisation has only enabled a small proportion of the defectives to be discharged from institutions. A failure of first efforts in this direction need not, however, surprise us, and further experiments should be sympathetically watched. The Committee are not prepared to deny that this measure might, under adequate safeguards prove of value in a very limited number of individual cases seleced from among the more stable type of defective with no anti-social tendencies, though they cannot disguise from themselves the serious difficulties that would arise in restricting sterilisation to this particular type of case. They feel, however, that there is not sufficient evidence at present to justify the general adoption of sterilisation of defectives, and are convinced that, even if it were adopted, no great alleviation of the burden of mental deficiency would follow.

Three Grounds for Hesitation.

In the first place, in the Committee's view, sterilisation would not reduce to any appreciable extent the numbers of defectives already in institutions, since the large majority of these have been admitted and are retained because they are urgently in need of the care and protection which institutions alone can give. The sterilisation of the mentally defective adult is advocated by some persons as an alternative to what they regard as the more expensive method of segregation. Their assumption is that large numbers of mental defectives who are now retained in our institutions would be capable, if sterilised, of maintaining themselves economically, or at least of living harmoniously outside the institution. The consensus of opinion however amongst those who best know the practical capacities and the temperamental features of the patients who are at present in colonies and institutions, is that comparatively few of them would be fit to be restored permanently to live in the community. Sterilisation does not make defectives more stable, does not enable them to earn their living, does not prevent them from getting into mischief, and does not enhance their social efficiency in any way; it may, indeed, increase their moral danger, and prove injurious to the health of the community.

In the second place the sterilisation of a few individual cases, if legal sanction for this could be obtained would not appreciably, if at all, reduce the urgent need for a large increase in institutional accommodation. The Committee regard with much apprehension the tendency observed in some quarters to allow the discussion of this question and the hope of legislation on the subject, to retard the provision of the institutional accommodation which is so lamentably insufficient in all parts of the country. The cases to which sterilisation could profitably be applied are not among those for whom this additional accommodation is required, for it must be borne in mind that large numbers of defectives are not socially adjustable and should not be left in the community in any circumstances, while many of those who might ultimately be returned to the community would first require a long period of training and stabilisation to fit them for life outside an institution. Moreover, the view of many who have had wide experience of mental defectives in this country is that the freedom accompanying sterilisation, though it might increase the happiness of some defectives, would be positively harmful to many others.

In the third place the Committee believe that the legalisation of this measure, however carefully safeguarded, would inevitably greatly enhance the difficulties of bringing defectives within the scope of the Mental Deficiency Acts. The parent would be less likely to apply for the protection of the Acts to be extended to his defective child, the certifying officer would be more reluctant to issue his certificate, and the magistrate would be less willing to make an order, if it were known that such action on the part of each of them might render the defective liable to be sterilised.

Personnel of the Committee.

The names of those who have thus given their considered opinion on the merit of sterilisation as a practical method of dealing with mental defects in the adult, are: Mr. Arthur H. Wood, late Assistant Secretary, Medical Branch, Board of Education (*Chairman*); Dr. Ralph H. Crowley, Senior Medical Officer, Board of Education (*Vice-Chairman*); Mr. Cyril L. Burt, Psychologist, London County Council; Mr. Cecil Eaton Assistant Secretary, Medical Branch, Board of Education; Miss Evelyn Fox, Hon. Secretary, Central Association for Mental Welfare; Mrs. Hume Pinsent, Commissioner, Board of Control; Miss Hilda Redfern, Head Mistress, Monyhull Colony School for Mentally Defective Children.; Dr. Frank C. Shrubsall, Senior Medical Officer, London County Council; Dr. Alfred F. Tredgold, Lecturer in Mental Deficiency, London University; Dr. F. Douglas Turner, Medical Superintendent, Royal Eastern Counties Institution, Colchester; and Mr. N. D. Bosworth Smith, Principal, Medical Branch, Board of Education (*Secretary*).

PAY BEDS IN LONDON HOSPITALS.

The number of pay beds at voluntary hospitals in London is now 1154 distributed over 88 hospitals. The charges are usually about four to six guineas a week, exclusive of certain extras and of medical and surgical fees, though, at either end of the scale, there are a few beds for the well-to-do and some for those in straitened circumstances.

A complete list of the beds available at hospitals making returns to King Edward's Hospital Fund has been prepared and is obtainable for 6d. from the offices of the Fund at 7, Walbrook, London, E.C.4. For the convenience of our readers, we set out below a list of the hospitals which have pay beds, the number of beds and the normal weekly charges. This charge does not include any medical or surgical fees that may also be payable. In nearly every case one or more of the following specific services, if required, are charged for as extras, sometimes as an addition to the hospital charge, sometimes as part of the medical fee, viz.: Anæsthetist; exceptionally expensive drugs and/or dressings; electrical treatment; light treatment; massage; extra nurses; operating theatre; pathological examinations; radium; X ray.

For a description of the type of accommodation available (cubicles, wards with more than one bed, single rooms) and the number of beds allocated to either sex the list must be consulted.

General Hospitals with Schools.

Hospital.	Pay beds.	Normal weekly charge in guineas.	Hospital.	Pay beds.	Normal weekly charge in guineas.
Guy's	3	5 to 6	University College	8	6
King's College	65	5 to 8	Westminster	14	6 to 10
Royal Free	9	8			
St. Thomas's	40	6 to 9			

General Hospitals with R.M.O.

Acton	6	3½ to 5	London Temperance	5	6
Bolingbroke	15	4 to 6	Miller	8	5
Connaught	10	From 5	Nelson	14	3 to 5
East Ham Memorial	4	From 4	Putney	7	5
German	10	4 to 5	Queen Mary's	6	5
Hampstead General	21	3½ to 7	Royal Northern	38	4½ to 6
Hospital of St. John and St. Elizabeth	28	2½ to 15	St. Andrew's Dollis Hill	52	2½ to 8
Hostel of St. Luke*	31	0 to 7	St. John's Lewisham	3	4 to 6
Ilford	14	3½ to 5	Seamen's (Dreadnought)	20	3 to 4
Italian	5	3	Weir	4	3 to 5
King Edward Memorial	8	4½	West London	26	4 to 5
London Homœopathic	19	4 to 11	Willesden	15	3½ to 6
			Wimbledon	10	4 to 6
			Woolwich War Memorial	32	From 3

* Clergy and their families.

General and Cottage Hospitals Without R.M.O.

Beckenham Cottage	8	7	Hornsey Central	16	3 to 6
Blackheath	2	4	Kingston-on-Thames Victoria	3	3
Brentford	4	4 to 5	Mildmay Memorial	4	4
Bromley (Kent) and District†	4	6	Norwood Cottage	2	4 to 6
Carshalton	8	2 to 4	Passmore Edwards	6	From 4
Eltham Cottage	4	5	Phillip'sMemorial Homœopathic	2	2 to 7
Enfield War Memorial	2	4½	St. John's Twickenham	1	3 to 5
Finchley Memorial†	9	3 to 6	Victoria Cottage Barnet	4	4 to 6
Forest, Buckhurst Hill	8	3 to 6	Wembley	4	3½ to 5
Hanwell Cottage	1	From 3	Woodford Jubilee	6	3 to 7
Hendon Cottage	5	5 to 6			

† For local residents only.

Hospitals for Women.

Chelsea	18	5	Hospital for Women (Soho)	12	5
Elizabeth Garrett Anderson	8	4 to 6	St. Saviour's	21	2 to 5
Florence Nightingale	38	2 to 4	Samaritan Free	9	6
Grosvenor	5	2½ to 4	South London	22	4 to 6

Other Special Hospitals.

All Saints' (Genito-Urinary)	2	5	London Fever	24	7 to 10
Belgrave (Children)	12	3	London Lock	12	2 to 5
Bermondsey Medical Mission (Women and Children	3	2 to 5	Mount Vernon (Cancer)	12	From 5
Central London Ophthalmic	3	4 to 6	National Heart	1	5
Central London (Throat, Nose and Ear)	6	4½ to 5	National, Queen square (Nervous Diseases)	4	Up to 3
City of London Maternity	7	5	Royal Eye	2	5
Clapham Maternity	4	3	Royal National Orthopædic	12	4 to 6
Golden-square (Throat, Nose and Ear)	24	5 to 7	Royal Waterloo (Children and Women)	9	3 to 7
Gordon (Rectal)	16	3 to 5	Royal Westminster Ophthalmic	14	5 to 6
Hospital for Consumption Brompton	43	4	St. Mark's (Rectal)	10	5 to 6
Hospital for Tropical Diseases	50	3 to 7	St.Paul's (Genito-Urinary and Skin)	11	5
Jewish Maternity	3	6	St. Peter's (Stone)	6	5
			South-Eastern (Children)	4	2 to 3
			Stoke Newington (Women)	8	2 to 3½
			Victoria (Children)	12	5

In a preparatory note the Fund expresses approval of the insurance scheme for the middle and professional classes outlined last year in the report of its Pay Beds Committee.

Public Health Services.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

THE following are 1928 statistics of four boroughs:—

Name of district and estimated (R.-G.) population.	Birth-rate.	Death-rates per 1000 of the population.					Death-rates per 1000 births.		
		All causes.	Tuberculosis.	Cancer.	Respiratory diseases with influenza.	Heart disease.	Infant and neonatal mortality.	Young child (1–5 yr.) mortality.	Maternal mortality from childbirth.
Watford (54,460)	15·4	9·4	0·68	1·40	1·1	1·4	52/35	—	3·5
Torquay (38,170)	14·5	14·3*	1·28	1·81	2·3	2·5	50/25	5	5·4
Tunbridge Wells (34,820)	11·7	15·0†	0·75	2·17	2·1	3·0	49/27	24	4·9
Chelmsford (23,680)	15·7	9·5	0·93	1·10	1·1	1·6	48/27	21	10·7

* Standardised rate, 10·5. † Standardised rate, 11·0.

Watford.

Dr. W. J. Cox says that the two chief public health questions of his borough are housing and the provision of public baths. During 1928 435 subsidy houses were erected, 24 by the local authority and 411 by private enterprise. There is much overcrowding in the smaller houses and the decision of the council to build another 110 houses is well-timed. The closing and demolition of 139 houses during the last four years has made the slum question in Watford much less evident. There are 700 families on the waiting-list for houses and 30 new houses are needed to replace houses which ought to be demolished. The supervision of the watercress beds is being continued, although none was closed in 1928 as compared with three in 1927. Dr. Cox points out that the existence of watercress beds in thickly populated urban districts is not desirable, but that in a rural district it is a different matter if the cress beds can be provided with a pure water-supply and are so situated that the general public has no access to them. The Red Cross orthopædic centre did valuable work and a list is given describing the nature of the 58 cases referred to the clinic which is conducted by Mr. S. L. Higgs, F.R.C.S.

The isolation and small-pox hospitals serve a population of about 40,000 in the surrounding district in addition to the residents of Watford. Watford is growing rapidly and Dr. Cox thinks 100 beds are needed instead of the 66 at present provided. The small-pox hospital was opened twice. Between Feb. 3rd and Feb. 11th three "casuals" were admitted from the workhouse, each of whom had contracted small-pox in quite different parts of the country. On May 29th another "casual" was admitted by whom a Watford resident was infected. A proposal to pool the small-pox accommodation in the county did not meet with the approval of the management of the joint hospitals, it being held that Watford might suffer if it had to provide small-pox accommodation for a larger district than at present.

Torquay.

Dr. Thomas Dunlop says the opening of the New Torbay hospital with its up-to-date maternity wards has met a much-felt want. The maternity ward has eight beds and arrangements have been made by the council for the admission of necessitous cases. A separate antenatal clinic is to be established at the hospital. The clearing of the Pimlico insanitary

area has reached its final stage, but there are still certain properties on the area which are not insanitary, but are essential to the scheme and which will have to be acquired by arbitration. The gathering ground of the water-supply is being extended and it is expected that the new source of supply will be available during the summer of the present year. The gathering ground is on the borders of Dartmoor and the water, although soft, contains sufficient lime and magnesia to prevent any solvent action on lead. Housing remains a difficult problem and there are still a large number of applicants living under bad conditions. The new houses erected numbered 198, of which only 20 were subsidy houses, all municipal. A vita-glass sun lounge has been erected by the council as an adjunct to the medical baths. The record kept of the results of the acetone methylene-blue tests shows that Torquay is high up among the places keeping such records, and the hours of bright sunshine numbered 1845·6.

Tunbridge Wells.

Dr. F. C. Linton says that one patient was admitted to the small-pox hospital, which serves Tunbridge Wells and the surrounding districts, and made a good recovery. There is an increasing demand for the beds at the maternity home, which is a "voluntary" institution, serving the surrounding district. Ninety-four of the patients admitted were Tunbridge Wells residents, for nine of whom the corporation paid the fees according to agreement. The question of the extension of the home is now under consideration. For half the year Tunbridge Wells is supplied with water from springs in the Tunbridge Wells sandstone. During the remainder of the year this supply is supplemented by artesian wells bored through the Wadhurst clay to the Ashdown sand. Until the dry season of 1921 these two sources were adequate, but at the present time the work for a further supply, by boring down to the Ashdown sand in another position, is in hand. The number of new houses erected was 94, of which 34 were municipal and nine private enterprise subsidy houses. The construction of an open-air school was to have been begun in the autumn of 1928, but at the last moment the site was discarded and a search is being made for a new site with more advantages. In the meantime voluntary workers are making provision for some of the delicate children who need an open-air school. The work of the aural clinic for the school-children, which is held at the Eye and Ear Hospital, shows a large increase and on April 1st an orthopædic clinic was established at the General Hospital under the auspices of the education authority. The rainfall, about 34 inches, exceeded the average, largely owing to a fall of seven inches in October. The 1810 hours 18 minutes of bright sunshine made Tunbridge Wells an easy first for sunshine amongst the inland health resorts.

Chelmsford.

Dr. Richard H. Vercoe reports that at the end of the year the scheme to obtain water from the river Chelmer was nearly completed. The treatment tanks are divided into nine compartments. Sulphate of alumina solution and lime-water are added at the point of entry and carbonic acid gas is diffused in the water in the penultimate compartment. After storage the treated water is pumped through Paterson pressure filters to the service reservoir, chlorine gas being added to the water both, before and after filtration. There is a well-equipped laboratory, where constant tests will be made by a resident chemist. There are a large number of houses in Chelmsford which are constantly in need of repairs to keep them fit for human habitation, and in some cases demolition is the only satisfactory remedy. About 50 are only fit for demolition; and 300 more need regular repairs. On the municipal estate 62 houses were completed during the year and 56 are contracted for. An antenatal clinic was held monthly at the Chelmsford Hospital and attended by 34 expectant mothers. The report of the veterinary inspector, Mr. W. Mulvey, states that all the cows and cowsheds are inspected at least once in every two months. The sheds number 11 and the cow population is about 250. Twenty-two cows were removed from the cowsheds during the year and 20 cows tested with tuberculin.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED JULY 6TH, 1929.

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 153 (last week 160); scarlet fever, 1898; diphtheria, 990; enteric fever, 44; pneumonia, 909; puerperal fever, 49; puerperal pyrexia, 98; cerebro-spinal fever, 12; acute poliomyelitis, 7; encephalitis lethargica, 22; continued fever, 1; dysentery, 14; ophthalmia neonatorum, 115. No case of cholera, plague or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the Metropolitan Asylums Board on July 9th-10th was as follows: Small-pox, 209 under treatment, 6 under observation (last week 196 and 8 respectively); scarlet fever, 1320; diphtheria, 1660; enteric fever, 8; measles, 231; whooping-cough, 437; puerperal fever, 28 (plus 9 babies); encephalitis lethargica, 124; "other diseases," 30. At St. Margaret's Hospital there were 18 babies (plus 9 mothers) with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns, including London, there was one death from small-pox, 5 (1) from enteric fever, 42 (8) from measles, 5 (0) from scarlet fever, 30 (8) from whooping-cough, 16 (7) from diphtheria, 48 (7) from diarrhœa and enteritis under two years, and 25 (5) from influenza. The figures in parentheses are those for London itself.

The single death provisionally classified to small-pox was assigned to Stepney. Liverpool reported 12 deaths from measles, Wallasey, Salford and Leeds each 3. Three deaths from whooping cough occurred at Sheffield. The highest figures for diarrhœa were Birmingham and Liverpool each 8, Manchester 5, Nottingham, Warrington and Salford each 3.

The number of stillbirths reported during the week was 276 (corresponding to a rate of 40 per 1000 births), including 49 in London.

RESEARCH IN THE BREWING INDUSTRY.

MANY industries in this country have been carried on for hundreds, or in some cases for thousands, of years on purely empirical lines, and it is only since the later decades of the nineteenth century that science, with its exact knowledge based upon definite facts, has intervened to displace gradually the former universal rule-of-thumb methods. Even now there are business men who consider science of little value apart from its immediate application to their own problems and the production of increased profits They do not realise that "Science moves but slowly, slowly creeping on from point to point." But the industrialist does appreciate the value of a sound knowledge of fundamental principles, and the 1929 Memorandum of the Research Scheme of the Institute of Brewing is a good illustration of this fact. This memorandum summarises a number of investigations carried out under the ægis of the Research Committee, many of them in collaboration with other bodies. They include the production of new varieties of barley and hops, the effects of various agricultural conditions, chemicals and biological methods for the evaluation of hops and methods of defence against their field parasites, and the utilisation of the nitrogenous constituents of wort by yeast. The magnitude of the undertaking may be realised when it is considered that the whole of the factors under investigation, from the breeding of the barley and hops, must be correlated singly and in conjunction with the qualities of the finished beer. The Research Scheme is administered by a committee in conjunction with various advisory sub-committees, the members of which are representative of all branches of the brewing industry, together with botanists, chemists, bio-chemists and growers of barley and hops. Team work of this kind may well have results of value outside the brewing trade, in which it is not forgotten that the brilliant bacteriological researches of Pasteur, when applied by Lister, revolutionised the practice of surgery.

Correspondence.

"Audi alteram partem."

THE DEVELOPMENT OF PULMONARY TUBERCULOSIS.

To the Editor of THE LANCET.

SIR,—Dr. H. V. Morlock's paper in your last issue will be welcomed by many as throwing considerable light on that somewhat "elusive Pimpernel," the early case of pulmonary tuberculosis. The tuberculosis officer, no doubt, sees, or should see, most of the cases in his district, but it is an unfortunate fact that the number of early cases examined are few and far between. I feel however that they do, if discovered, conform to the description given by Morlock, and quote the following two cases as examples.

1. A. B., female, aged 26, was well until Christmas, 1928, when she had an attack of pyrexia with cough. On examination in January, 1929, her general condition was good and no signs detected. The cough continued with pyrexia and in April, at the onset of expectoration, her sputum was positive, crepitations were heard below the left clavicle and at the left apex behind, and an X ray photograph showed a triangular opacity just below the left clavicle, with the base against the ribs and an appearance of cavitation.

2. C. D., female, aged 18, had, as it happened, been under close medical supervision. In July, 1928, her weight was 8 st. 5½ lbs., her general condition very good and she had no physical signs. In December, 1928, her weight had increased to 8 st. 7¼ lbs., her general condition was still good with no physical signs, but she complained of an irritable cough and her temperature was 99·2° F. In February, 1929, her weight had fallen to 8 st. 2¼ lbs. Crepitations were now heard below the right clavicle, but not behind. Her sputum, when examined at the onset of expectoration, was positive on three consecutive days, and X rays showed an area of infiltration, proceeding to cavitation in the right subclavicular region.

The above type of case, as already stated, is not often seen, for in the majority of cases, the tuberculosis officer is called in at a later date, when the infiltration has already spread upwards and downwards into the rest of the lung. I have myself been struck with the frequency with which patients state that they first consulted their doctor "some months ago" and were told that they were suffering with "influenza." This point is of great importance, and is brought out by Morlock in his paper. When diagnosing a sudden febrile attack as "influenza," the general practitioner should bear in mind the possibility that the case may be one of early tubercle, and although there may be no physical signs, he is fully justified in sending such a case for further investigation to the tuberculosis officer, who should have at his disposal complete facilities for X ray examination.

The particulars of another case show the disasters which may readily occur, if we do not orientate our minds to this new conception of phthisis with its acute onset and rapid progress.

3. E. F., female, aged 20, used to sleep in the same room as her sister A. F., who died of advanced pulmonary tuberculosis at Christmas, 1927. E. F. was examined as a contact in January and June, 1928, and was found to be in good condition with no physical signs. She remained under the care of her doctor, and in November last was sent to the throat department of a London general hospital for a sore throat. She was kept there for out-patient treatment and in January referred to a physician of the hospital for an opinion on her chest. No physical signs were found and she was given a clean bill of health but was unfortunately not X rayed. In May her own doctor suspected pulmonary tuberculosis, and she went away to a convalescent home. In June I was asked to see her and found an advanced case of tuberculosis with extensive signs in both lungs, any form of treatment being hopeless. The sputum was positive.

We must consider, if we intend to accept the views of Morlock and of continental workers, where they lead us. A consideration of contact examination in the tuberculosis of infancy, together with the post-mortem findings of Kuss, Gohn and Aschoff, and Armand-Delille and Lestocquoy, cannot but lead one to believe that in infancy tuberculosis is a true infective disease, spread directly from one person to another. It may be that the latest work on the development of pulmonary tuberculosis in the adult will lead us in the same direction, *i.e.*, that in the adult the disease is spread in the same way. Such a theory will shatter many of the tenets of our forebears, but inasmuch as it may lead to a study of the disease on more scientific lines, and perhaps to a discovery of more early cases, it deserves our consideration.

I am, Sir, yours faithfully,

C. H. C. TOUSSAINT,
Tuberculosis Officer, Bermondsey.

Grange-road, Bermondsey, S.E., July 16th, 1929.

LOSS OF APPETITE IN CHILDHOOD.

To the Editor of THE LANCET.

SIR,—Your comments on Dr. Garland's article and Prof. Mottram's letter on the same topic prompt me to say a word regarding the importance of educating the human palate from early years to appreciate and enjoy the right kind of food, and of not allowing natural healthy instincts to be spoilt by indulgence in tasty luxurious foods. A child brought up in the country on simple healthy food, and having the run of a well-stocked kitchen garden, displays an instinctive delight, not only in fruit, but in such vegetable produce as young peas, carrots, onions and lettuce. Why do we not take this hint and encourage children from quite an early age to cultivate their natural taste for these healthy foods? The wide range of adaptability of the youthful palate is shown by the ready way in which children of every country take to the national diet.

A word regarding sugar in the present connexion. Sugar is a good food from the point of view of nutriment, but unless given cautiously it is a bad food for children, in that it is apt to spoil the palate for simple healthy food. It is not a necessary food in the pure form; children can get all the sugar they need from starchy foods and fruit. Our ancestors reached the full status of manhood on a diet from which all pure sugar was excluded save that derived from occasional finds of honey. In Elizabethan times when beef cost three farthings a pound, the price of the same quantity of sugar was twenty shillings, the equivalent of much more of our present money, so that we may be sure the boy Shakespeare grew along all right on a diet from which both cane and beet sugar were conspicuously absent.

We shall do well, in considering the value of sugar as a food for children, to beware of the harm it may do in spoiling the palate, and in causing dental caries. I personally am convinced that the conversion of all the sweet-stuff shops in the Kingdom into fruit shops—assuming this were practicable—would lead to a great improvement in the health of our children. It would not be far from the truth to say that the near approach to practically all the elementary schools in London contain sweet-stuff traps, where the children spend their odd coppers. Now they enjoy an added service of ice-cream vendors.

I am, Sir, yours faithfully,

Harley-street, W., July 15th, 1929. HARRY CAMPBELL.

IMPLANTED RADIUM SEEDS.

To the Editor of THE LANCET.

SIR,—Dr. Joseph Muir, of New York city, in his article entitled Radium Treatment by the Implantation of Screened Seeds (THE LANCET, July 6th, p.), recommends for the radium treatment of bladder cancer the insertion of seeds through a cystoscope, and for prostatic cancer implantation into the gland only by the perineal route. Both methods, whether emanation or the element is used, I submit, are unsound from the pathological standpoint. On more than one occasion and recently by an article in the *Cancer Review* (July, 1929) I have drawn attention

to the necessity of thoroughly exploring the full extent of a bladder neoplasm before adopting radium treatment. With the aid of the cystoscope this is impossible; only digital exploration can ensure this knowledge.

Again, in cancer of the prostate Dr. Muir is advocating a method which I have described[1] and abandoned. Malignant disease of the prostate spreads along lymphatics situated in the fibrous sheath surrounding the vesiculæ seminales. It is useless to attack the prostate only, either from the perineum or the bladder, as I have learnt from an experience extending over 15 years. If any success is to be achieved in the radium treatment of this organ the seeds must be implanted in tissues far beyond the frontiers of the prostate.

I am, Sir, yours faithfully,

A. CLIFFORD MORSON.

Brook-street, Grosvenor-square, W., July 11th, 1929.

SHEWRY *v.* MAYBURY.

To the Editor of THE LANCET.

SIR,—The letter from a juror in this case, in your issue of July 13th, seems to call for comment on one point—namely, as to the contrast that was noticed between the attitude of the medical witnesses on the two sides.

In this case, I was called to give "expert evidence" on a comparatively small point—viz., the interpretation of the Wassermann test—but it so happened that I was present in Court on and off during almost the whole trial. I had not seen or tested the patient. One would have thought that the fact that two of the medical witnesses for Mr. Shewry were present during the whole time and in constant communication with counsel, whereas those for Dr. Maybury did not adopt this practice, was in favour of the latter. A medical witness is not an advocate.

There is another point. The clinical witnesses for the defence were all of them on the active staff of teaching hospitals, and if they had stayed in Court throughout the trial, which lasted over a week, they would have neglected their most important work of teaching students and ministering to the wants of their hospital patients. Those on the other side had no such obligation.

With the rest of the letter I think most of us who have to give expert evidence would agree, and the profession would surely welcome the trial of cases in which questions of clinical practice and pathology play an important part by judges with medical assessors rather than by jury. Even if the jury system had to be retained, it would be well if the medical opinions in a technical case were presented to them after they had been contracted into a coherent mass. It is the details that worry members of a jury and are apt to lead to confusion, which often results in a prejudiced opinion in a certain type of mind. Even the most lucid summing up by a judge—and I have never heard anything fairer or more lucid than that of the Lord Chief Justice in this case—is apt to fall on ears that have been rendered deaf by reiteration of technical terms. What some members of a jury do not seem to realise, however, is that in adhering to prejudice they are false to the oath that they have taken.—I am, Sir, yours faithfully,

A. KNYVETT GORDON.

Bedford-square, W.C., July 15th, 1929.

To the Editor of THE LANCET.

SIR,—A Juror's Reflections describe in concrete form the lack of method in submitting relevant technical medical evidence to a judge and jury. Four-fifths of the medical *opinion* in this case would never have been given to medical assessors. I was one of the ten medical witnesses! Judges decide on questions of law, juries on questions of fact. Expert opinion and expert evidence should be judged by assessors, on behalf of the Court. Important statements as to the results of arsenic injections into the brain, and as to the value or possibility of skull percussion were made on the one hand and denied on the other. No witness could state he had ever seen a solution of arsenic injected into the brain; one witness only had applied skull percussion to this case.

I submit two things (1) that McEwen, Dr. Alexander Robertson (Glasgow Hospital Reports, 1898), Jullès (Percussion du Crane) may be all wrong in the opinion of a particular witness, but to describe their writings and methods as "magic, not medicine," could only be to influence the jury as counsel for the defence, and is unworthy of our profession. (2) That the effect of injecting a solution of arsenic into the brain could only be judged by the condition it produces in the cellular tissue elsewhere.

We can all agree that it is unfair to prosecute nine years after an alleged act of negligence. There should be a Statute of Limitations. And "expert opinion" given by well-known men should be governed by the strict law of evidence, and not by their professional status. I am, Sir, yours faithfully,

Oakley-street, S.W., July 14th, 1929. W. B. COSENS.

To the Editor of THE LANCET.

SIR,—In your issue of July 13th "a Juror in the Lord Chief Justice of England's Court" reproduced in full a letter from the *Times* on Technical Evidence. Common juries are credited with common sense, special juries with special sense, for which fees are paid commensurate with the supposed educational standard and common sense of the two classes of jury members. Both classes of jury swear on oath or attest that they will listen to the evidence and upon the sworn evidence of the witnesses called for the plaintiff and defence shall on the law of evidence give their verdict. Sympathy is beyond their ken as a jury and is out of bounds. A jury is on a pedestal far above sentiment and sympathy. Each member has sworn to find his verdict on the evidence before the court.

"Special Juror" is not quite correct in his letter to the *Times*. All trials of necessity must have witnesses on one side and witnesses on the other. The jury have to determine on which side is the weight of evidence. The judge, whether it be a civil or criminal case, analyses the evidence and may or may not direct the jury. It is admitted on all sides that the summing up of the evidence in the case of Shewry v. Maybury was wonderful—the expression of a barrister. The Lord Chief Justice emphasised in his summing up that the jury had sworn to give their verdict on the evidence. It is not correct to say counsel were "labouring among technical terms which they did not always know how to pronounce." On one occasion only did counsel say when reading from an authority: "Then comes two words which I cannot pronounce."

"A Juror" goes on to say: "I was one of the majority in the jury, who were unwilling that after eight years a case should be brought up against Dr. Maybury." Sentiment is here again ruling "A Juror." The Lord Chief Justice so clearly laid down the law with reference to a minor, the law with reference to the statute of limitations, and the law with reference to charges for criminal offences. Contrition has now entered into the soul of "A Juror," when he says: "I now suffer from a distinct feeling that Dr. Maybury did not get justice *on the evidence*." What an admission for a special juryman to make, who, with the other members of the jury has sworn to find a true verdict on the evidence before the court. "A Juror" admits that the jury lamentably failed to carry out their sacred duty and were swayed by sentiment and prejudice. It must certainly be a very uncomfortable feeling when one has not acted up to and upon one's oath. How a letter to

[1] British Jour. of Surg., 1915, ii., 362; and 1920, viii., 36.

THE LANCET assuages "A Juror's" conscience may be relegated to metaphysics for a solution.

When "A Juror" mentions that "medical witnesses on one side remained in court and showed sincere interest in the case. Those on the other side appeared, spoke and disappeared like a drilled phalanx. This... was noticed by the jury"—when, I say, such nonsense is written by "A Juror," and such trivialities are taken notice of by members of a jury who have sworn to find a true verdict on the evidence, it is not difficult to understand the answers given by the jury to the questions put by the Lord Chief Justice. There was no "piteous muddle" anywhere in the conduct of the case. If there were a "piteous muddle" it emanated from the jury box. The case was opened high; the plaint having absolutely failed, side issues were embarked upon. Of such tactics the judge said he would have something to say later on, and his summing up expressed his extreme disapproval at the line counsel for the plaintiff had taken in shifting the charge of negligence to one of fraud. The Lord Chief Justice's remarks will ever remain indelibly stamped upon the memories of those who listened to those impressive words of disapproval.

If "A Juror" and the other members had listened attentively to the plaint, the sworn evidence, the cross examination, the speeches of counsel, the summing up of the judge, not forgetting they had sworn to find a verdict upon the evidence given, they would now be happier and wiser, sentiment and prejudice having no place in the finding of their verdict.

I am, Sir, yours faithfully,

July 17th, 1929. LEX.

CONGRESS OF THE ROYAL SANITARY INSTITUTE.

About 1500 delegates arrived in Sheffield at the beginning of the week to attend the annual congress of the Royal Sanitary Institute. Nine hundred of them, or thereabouts, represented governments at home, in the Dominions and India, or abroad, and the meeting is notable because of the unusually large number of participants from every continent. The business of the Congress is being conducted in six sections—viz., Preventive Medicine, Architecture and Engineering, Maternity and Child Welfare, including School Hygiene, Hygiene of Food, Hygiene in Industry, and Veterinary Hygiene; and there are also seven conferences of special officers. A large congregation assembled for the opening service in the cathedral and listened to a stimulating address from the Bishop of Sheffield. Dr. Burrows traced the extraordinary development of the sanitary conscience since Beaconsfield uttered his famous parody, "Sanitas sanitatum, et omnia sanitas," and referred to many of the pioneers, including Shaftesbury and Charles Kingsley. The public conscience, he said, had become much more assertive in his lifetime and no political party dared treat housing and sanitary matters as if they did not matter. Sanitary reform was now part of Christian duty and had become international in its aims. All this work implied faith that it was God's will that man should improve.

On Monday, July 15th, the Lord Mayor of Sheffield presided over a gathering of 500 at the Congress luncheon. The Bishop of Sheffield in proposing the toast of the Institute, sketched the history of its growth and good work during its 53 years' existence, and made special reference to the international character of its operations. The Chairman of the Council, Mr. Edward Willis, in returning thanks, hoped and thought that the present week would be a memorable one in the history of Sheffield and of the Institute. The Duke of Northumberland, in proposing the toast of the municipality, made special reference to the versatility of the present Lord Mayor and his personal efforts for the welfare of the community.

At the inaugural meeting held at the University, the retiring President, the Duke of Northumberland, inducted his successor, Earl Fitzwilliam, who, in his address, spoke of the extraor dinary changes caused in the Sheffield neighbourhood during his lifetime by industrialisation. Instead of scattered hamlets and villages, they had everywhere gigantic colliery undertakings, which made all the more necessary the beneficent activities of bodies such as the Sanitary Institute. Lord Fitzwilliam referred particularly to the need for a better allocation of the available water-supply of the country. A vote of thanks to the President was moved by Sir Arthur Newsholme and supported by Surgeon W. H. Frost (U.S.A.) and the Bishop of Sheffield, who indicated his faith in future progress by the remark that the world would be a much better place to live in when we were all dead and buried.

A delightful function on July 16th was the luncheon given to the delegates from overseas by the Council of the Institute. Dr. Charles Porter presided and welcomed the guests in felicitous terms, which were warmly reciprocated by Colonel Phya Damrong Baedyagun (Siam), who spoke of the great improvement in conditions of life in London during the 25 years interval between his two visits to England, by Sir Henry Barwell (Agent General for South Australia), by Miss Howard (Nova Scotia), by Dr. P. S. Fridericia (Denmark), by Dr. Mallik (India), by Councillor W. H. Port (Johannesburg), who said "the city of sunshine built on gold" was making use of the best of the sanitary experiences of the old country, and by Miss Ellen Babbitt (U.S.A.)

PREVENTIVE MEDICINE IN LONDON.

THE NEW SCHOOL OF HYGIENE AND TROPICAL MEDICINE.

THE great new building opened in London this week is something more than the Institute of State Medicine envisaged by the Athlone Committee of 1921. It will be an international, as well as a national, centre of public health, and its definition of preventive medicine will cover the needs not of this country alone, but of the whole inhabited world.

So wide a view of its functions is justified partly by its constitution, and partly by the way it has come into being. On the one hand, union of the new school of Hygiene with the old School of Tropical Medicine gives it a large basis and historical continuity, whilst on the other, it has an international status from the first, because it is built with American money for the benefit of the world at large, and not of Englishmen alone. London has many advantages as the site of such an institution, but its chief claim to outside assistance for public health work lies in this country's past record rather than its present needs. The Rockefeller Foundation's grant of £460,000 to build a new school is doubtless made in the lively expectation that this branch of English medicine is still capable of contributing something important and individual to the progress of mankind.

It will be remembered, however, that the grant was conditional on financial support from the British Government, and that the capital sum available was not to be used for running the School. Thus, from the time of its opening, the new building, though the gift of American citizens, will be a national concern, in which we hope to take a national pride. Moreover, thanks to the generous terms of the grant, the design and construction has been left to those who will control the fortunes of the School—notably, Dr. Andrew Balfou, (the Director) and the heads of the various divisions.

The type of building required needed long and careful consideration, and when preliminary plans had been prepared, a limited number of architects with experience in laboratory construction were invited to submit designs. The one prepared by Mr. P. Morley

Horder was approved, and has been executed by Mr. Verner O. Rees in association with him.

Having already published a full account[1] of the structure, we need now do no more than draw attention to some of its principal features. The accompanying photograph (Fig. 1) gives an idea of the outward appearance. The walls of Portland stone confer an air of permanence desirable in public buildings, and the work has been carried out with imagination as well as restraint Thus the roving eye is at once edified by a frieze bearing the names of twenty-one pioneers of public health, and entertained by gilded insects on the balconies—surely the first official appearance of the louse as a decorative emblem?

FIG. 1.

The London School of Hygiene and Tropical Medicine.

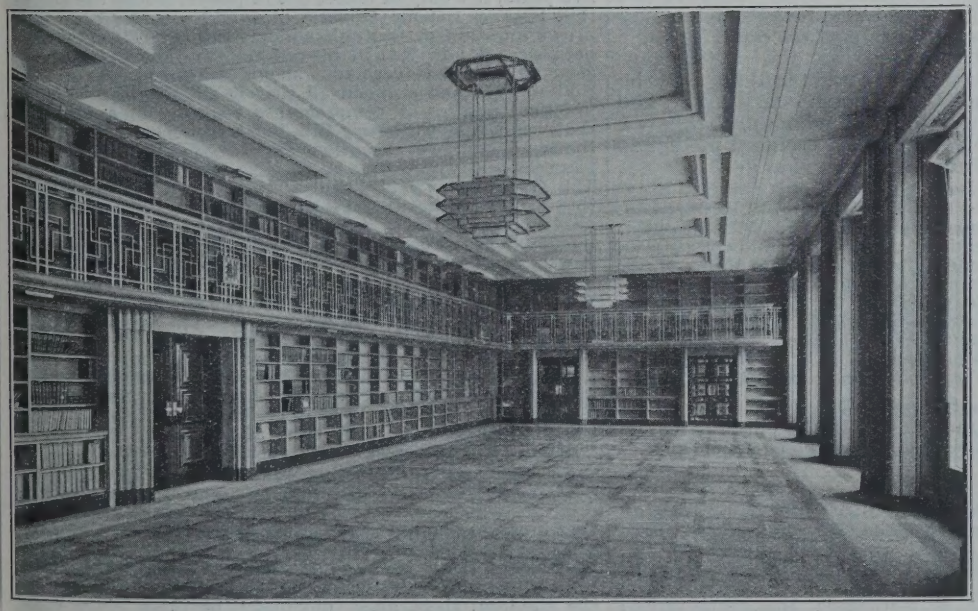
The pioneers whose names are commemorated in the frieze are as follows:—

H. M. Biggs (1859–1925), Edwin Chadwick (1800–90), William Farr (1807–83), J. P. Frank (1745–1821), W. C. Gorgas (1854–1920), Edward Jenner (1749–1823), Robert Koch (1843–1910), C. L. A. Laveran (1845–1922), William Leishman (1865–1926), T. R. Lewis (1841–86), James Lind (1716–94), Joseph Lister (1827–1912), Patrick Manson (1844–1922), E. A. Parkes (1819–76), Louis Pasteur (1822–95), Max von Pettenkofer (1818–1901), John Pringle (1707–83), Walter Reed (1851–1902), Lemuel Shattuck (1793–1859), John Simon (1816–1904), and Thomas Sydenham (1624–89).

On the left of Fig. 1 is Gower-street, whilst on the right is the Keppel-street frontage and main entrance of the building. The block looking out on Keppel-street is mainly devoted to the rooms required for public use. The entrance hall affords direct access to a lecture theatre seating 250 persons. On the first floor is a library (Fig. 2), 33 feet wide and 120 feet long, apart from accessory rooms with which it communicates. On the third and fourth floors is the museum of hygiene, which has 15,000 square feet of floor space and will be open to the public. It is divided into three sections—namely, sanitary engineering, hygiene in

[1] THE LANCET, 1926, ii., 36.

FIG. 2.



The Library.

the general sense, and tropical medicine—and many of the exhibits will be furnished gratis by commercial firms and kept up to date by them.

The rest of the building takes the form of a letter H whose bases rest on the Keppel-street block, and the whole is thus built round two courtyards, measuring 160 × 80 and 100 × 80 feet, in such a way that light and air are amply supplied to every part. The various wings and floors are divided into the territories of the various divisions and departments of the School, according to the description we have already given, and there are numerous large laboratories and lecture rooms admirably reflecting the intention of the architect and Director to make "a workshop in which all the parts will be appropriate for their use, durable and lasting in construction, and in proportions exactly related to the whole." At first sight, this ideal and its achievement may seem far removed from the temple schools where medicine was first taught in Europe; yet the new building in Bloomsbury is nothing if not the modern concept of a temple to Hygeia. It is true that five-sixths of its space will be reserved for teaching in one form or another, and the post-graduate student will be asked to work rather than to pray. But these two functions are now regarded as largely interchangeable and the record of the staff is a guarantee that prayerful research after truth will not be lacking in the proper places and that the sacred animals of this particular temple will not be sacrificed in vain.

The organisation of the School, and its connexion with special institutions and branches of the public health service, have been made clear in a number of editorial articles in our columns, and a certain amount of information about them can be gained from the list of the principal members of the staff, which follows. There is, however, one aspect of the work to which special attention may be drawn. In the words of Prof. Jameson "it is earnestly desired that the School should become a centre to which all those interested in public health may look for assistance and advice. Members of the public health service will have a common-room placed at their disposal, and will be welcomed at all times—not only at the lectures given by the staff of the School, but also at the series of special afternoon lectures to be delivered by recognised experts on special public problems. We have no greater need at the present time," he says, "than for some sort of centre where our own public health workers can meet those from other lands, and discuss how best the experience of both may be made of service to the world at large. In this respect the London School of Hygiene and Tropical Medicine may be expected to play a not unimportant part."

The School was inaugurated as one of the constituents of the University of London in 1924, and the new building is intended to accommodate up to 250 students (of all nationalities), of whom probably not more than 100 will be working at tropical medicine. The present staff includes the following:—

Director—Dr. Andrew Balfour.

Directors of Divisions—Public Health: Prof. W.W. Jameson. Bacteriology and Immunology: Prof. W. W. C. Topley. Biochemistry and Chemistry: Prof. Harold Raistrick, D.Sc. Epidemiology and Vital Statistics: Prof. Major Greenwood, F.R.S. Tropical Medicine and Hygiene: Dr. Balfour. Medical Zoology: Prof. R. T. Leiper, F.R.S.

Directors of Departments—Chemistry: Prof. M. E. Delafield. Helminthology: Prof. Leiper. Protozoology: Dr. J. G. Thomson. Entomology: Dr. P. A. Buxton.

Director of Institute of Animal Parasitology—Prof. Leiper.

The Secretary of the School is Mr. R. W. Harris, the Curator of the Museum Dr. H. B. Newham, and the Director of Library Services, Dr. J. F. C. Haslam.

BRITISH INSTITUTE OF RADIOLOGY (incorporated with the Rontgen Society).—The following officers have been elected for the coming year:—President: Mr. C. Thurstan Holland, F.R.C.S.; Vice-Presidents: Sir W. H. Bragg, F.R.S., Dr. L. A. Rowden, and Dr. C. E. S. Phillips; Hon. Treasurer: Dr. D. B. McGrigor; Hon. Secretaries: Dr. Stanley Melville and Mr. G. Shearer, D.Sc.; Hon. Editors: Mr. G. W. C. Kaye, D.Sc., and Dr. R. J. Reynolds.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

LOCAL GOVERNMENT (SCOTLAND) ACT.

IN the House of Commons on Wednesday, July 10th, the debate was resumed on the motion that an Address be presented to His Majesty, thanking him for the Gracious Speech from the Throne.

Mr. MACPHERSON moved an amendment to the Address regretting that the Gracious Speech contained no reference to the demand for the suspension of the operation of the Local Government (Scotland) Act, 1929, until further inquiry had been made as to its effect, and consultation had taken place with the authorities concerned. He said that at the General Election there was scarcely a platform in Scotland on which the local government proposals of the late Government were not described by the Labour Party as anti-democratic, retrograde and reactionary, and instead of the miserable allocation of the new block grant which they were going to get under that Act, it was suggested that they were going to get huge schemes for Scotland as soon as the Socialist Party were in office. This amendment gave the Government an opportunity to respond to Scottish democratic opinion. The Secretary for Scotland could not deny that there was a very strong and clamant opinion in Scotland against the Act, and the real question was whether the Government were prepared to give an opportunity for consultation with the local authorities. The Royal and ancient burghs of Scotland had been the pioneers of liberty, and it was no wonder that they resented the treatment given them under this Act. They were being well-nigh obliterated, so far as real powers were concerned. The individuality of the Royal burghs had been the saving grace of local government in Scotland, but under this Act that individuality was to be destroyed, and they were to become the creatures and serfs of the mushroom-growth County Councils. The parish councils, the second body concerned, were a thoroughly democratic body and, as the Prime Minister had suggested in his excellent vote-catching speech in Glasgow, there was no reason whatever why because boards of guardians were being abolished in England the equivalent body in Scotland, the parish councils, should be abolished too. Education had always had a special significance in the minds of the people of Scotland, and there was great animosity against the late Government for trying to wipe away the 1918 Education Act.

The Prime Minister's Pledge.

Mr. RAMSAY MACDONALD, Prime Minister, said that he wished it were possible to suspend the operations of the Act and consult authoritative Scottish representatives as to amendments and then pass them as quickly as possible, but he did not know whether that was possible. If Labour had five years, not only of office, but of power, before the end of that time, a Labour Goverment would consider the whole broad question of Scottish administration. This Act had been passed and was in operation. Mr. Macpherson suggested that the Government should take from the Act all that it liked and suspend all that it did not like. Was it practical politics or commonsense to bring in a new Bill that was not a suspensory Bill, but a suspensory Bill with a thousand and one exceptions? It would be full of complexities and would take more time than the original Bill. The Government had found that with a little adjustment they could separate education and suspend the education provisions of the Act. A Bill had been drafted and it would be introduced and printed so that the House could see what it was, and find out if it would be possible to get it through in a reasonable time. If that could be done with goodwill, which did not amount to agreement, and with a helpful discussion, the Government would find the necessary time. The pledge which he gave at Glasgow held. What was in his mind was this: If they could save education they must give the other parts of the machine time to work, and after about twelve months of experience an inquiry would begin. That inquiry would be primarily into local administration though he would be very sorry if the larger question of Scottish self-government were excluded.

Sir JOHN GILMOUR (who was Secretary of State for Scotland in the late Government) said that one of the difficulties in dealing with education in Scotland had been that more and more the education of the children was being linked up with the health services of the country, and if they were to have even ad hoc education authority, separate from those authorities which had to deal with the health of the children, there must obviously be cases where there would be a lack of co-ordination, an increased and unnecessary expenditure, and a duplication of officials, which was

unnecessary and undesirable. All he could say at this stage, speaking for the Conservative opposition, was that while, of course, they would consider any Bill which His Majesty's Government might introduce, they stood by the Act as it left that House. In their view the proper procedure, whatever the Government might do at a later stage, was to let the Act come into operation. It was not fair to the local authorities or to the House of Commons to rescind an Act of a previous Government in a manner which left great dubiety in the minds of those who had to administer these questions.

Mr. T. JOHNSTON, Under Secretary of State for Scotland, said that they were faced with this situation. The teachers' organisations in Scotland had definitely taken a stand, for reasons which they considered to be valid, against ad hoc authorities. On the other hand, practically the entire body of local administrators in Scotland, people of all sections and classes and political persuasions, had declared in favour of ad hoc authorities. The Prime Minister had suggested that the House would be well advised to accept not an amending Bill, not a repealing Bill, but a mere measure of suspension so far as the education clauses were concerned, and that forthwith there should be set up an inquiry—whether a committee or a commission he was not in a position to say—before which all sections of public opinion in Scotland could present their views, and the House of Commons at a very early date would then be in a position to give a considered judgment as to whether or not the ad hoc system should be retained. The Government would use all their persuasive powers to induce the local authorities, education and health, during the interregnum and the period of inquiry to prevent overlapping, and to see to it that the health of the children should be properly looked after.

Physically Defective Children.

The Duchess of ATHOLL said that in previous debates when the Act was passing through the House reference was made to the overlapping that had occurred in regard to clinics under the ad hoc system, and also to the economy that would be possible in the provision of hospitals under the Act in general. There was another respect in which coördination between the medical services of the schools and of other authorities seemed to her vital to the welfare of the children of Scotland She referred to the question of defective children. Anyone who had studied the question of physically-defective children knew that in the last few years a new hope had arisen on the horizon for those children. They were told on the highest surgical authority that there was real hope in the great majority of cases of preventing lasting crippledom provided the children could get orthopædic treatment at an early enough age. In England and Wales fully half the education authorities had schemes for the orthopædic treatment of children, every one of which had been concerted jointly by the education committee of the Council and the maternity and child welfare authority. Such concerted action had been very much facilitated by the fact that in many areas, notably in the county burghs, both these authorities were part and parcel of the main authority—namely, the borough council. As a result of this concerted action, if they visited one of these hospital schools for orthopædic treatment, they found, if it had been in existence for some time, that the children in it were very young, almost in arms, or at any rate "toddlers," because the medical officers realised how much more valuable work could be done if the children were brought there long before school age. As a result of this treatment there was in some areas practical evidence of the decrease of crippledom. In Scotland they had so far very little orthopædic treatment for these children. They had a splendid educational system, but that was one of the ways in which there was room for improvement. It was just as vital in Scotland as in England that any treatment of that kind should include children below school age, as well as those who were old enough to attend school. Was it not obvious that they would have a far better chance of coördinated concerted action in cases of this kind if the education authority was the town or county council which in Scotland under this Act would also be the authority for maternity and child welfare? Take again the case of the mentally-defective children. There were many children of this type who were not receiving proper care either in Scotland or in England. There were those who were described as educable in regard to whom the responsibility fell on the education authority, while those who were regarded as non-educable were at present under the parish council and district board of control. Very often these children fell between two stools and nothing was done for them. She had heard of cases where parish officers had come to the medical officer of the school authority and implored him to declare educable children previously declared non-educable so that the parish council might be relieved of the responsibility of looking after these children. Lately in England and Wales these children had been the subject of a long and exhaustive inquiry by a committee which had recently reported. The main purport of that report has been to ask for much more flexibility in the way of treating these children, and many suggestions were made for much closer coöperation between the authorities for the educable and the non-educable. Did not all that show the importance of having machinery in Scotland under which education would be one department of the county council and the care of these unhappy children who were declared non-educable would be the responsibility of another branch of the same body? That would offer them a chance which had not yet been provided for them. She was very pleased to think that many medical men and women were included in the ranks of those newly returned to the House of Commons as representatives of the Labour party. She would ask them how they could find it in their hearts and consciences to vote for the repeal of provisions which gave so much greater opportunities for the care of mentally-defective children than they had ever yet been able to enjoy?

Mr. JAMES STEWART said that he was strongly in favour of the unification of the health services. He believed that if they unified those services under one authority they would promote efficiency in a most important direction. But the late Government in their Act did not do that. They merely transferred from one authority to another the carrying out of the administration of the work of the parish council and of education. It would be a good thing if the Government would press on with the inquiry so that they might help to bring about the reform in local government which everyone in that House without regard to party was agreed was necessary.

Major ELLIOT said let the House end this interminable grinding and regrinding of outworn problems and settle this problem here and now, and pass on to newer and fresher problems which urgently needed consideration. The Conservative party were against this inquiry proposed by the Prime Minister; they were against the Bill which he proposed to print and circulate, and would offer it the most definite and uncompromising resistance. They believed quite firmly that the proposals which they had brought forward were for the good of Scotland, and that four-fifths of them had commended themselves to the people of Scotland. It was not proposed to touch them; they were to be allowed to operate, although it was proposed to inquire into them. With regard to the ad hoc or ad omnia education authority opinion, medical opinion at any rate was agreed that the unification of the health services should take place; and many were agreed that the control of finance by the central financing body should take place. Take away the control of finance and take away the health services and what was left of this ad hoc authority which it was proposed to put under the authority of an ad omnia body? The decision had been made, and the inquiries had been held: let them at any rate try what could be done under the new system. The Conservative party would vote with the Government on this occasion; they had no hesitation in voting down the suggestion for suspending the whole of the Act; when the proposal to take out some of its provisions came forward they would meet it with the same uncompromising opposition.

Reply to the Debate.

Mr. WILLIAM ADAMSON, Secretary of State for Scotland, replying to the debate, said that as to the coördination of effort on health and relief services he saw no reason why that should not be secured by coöperation between the local authorities concerned as it had been in the past. In fact, the threat to the life of the education authorities should be a warning that such coöperation was vital if their independent existence was to be justified.

The amendment to the Address was negatived by 374 votes to 51.

The Functions of Education Authorities.

On Friday, July 12th, Mr. W. ADAMSON, Secretary of State for Scotland, presented a Bill to amend the provisions of the Local Government (Scotland) Act, 1929, with regard to the functions of education authorities.

The Bill was read a first time.

THE HOUSING SUBSIDY.

On Monday, July 15th, the House of Commons went into Committee, Mr. YOUNG in the chair, on the following resolution:—

That it is expedient that the provisions of the Housing Acts (Revision of Contributions) Order, 1928, relating to houses subject to special conditions in the case of which contributions are to be provided under section two of the Housing (Financial Provisions) Act, 1924, should cease to have effect and that the same contributions should be payable and the same provisions applicable in the case of any such houses completed after the thirtieth day of September, nineteen hundred and twenty-nine, as are applicable in the case of any such houses completed on or before that date, and that all such additional amounts as

may become payable by virtue of this Resolution should be defrayed out of moneys provided by Parliament."

Mr. GREENWOOD, Minister of Health, in moving the resolution said, that he proposed, until September next year, when the next revision was due, to maintain the subsidy under the 1924 Act, at its present level. The same policy had been adopted in the case of Scotland. As regards the subsidy under the Chamberlain Act he proposed that that should be allowed to fall, as the late Government desired that it should fall. He had received an assurance from an important body representing the local authorities of this country, that if the subsidy order was modified as the Government were now proposing, he could rely on the local authorities continuing their building programmes without the hiatus which would otherwise inevitably follow. The resolutions, and the Bill which would follow, were designed merely to bring a measure of stability and continuity to the building of houses to let, while a larger and more comprehensive scheme was being prepared and being passed through Parliament. He hoped that with the hearty coöperation of the building industry, and in the closest association with the local authorities, to secure within a relatively short time, the adoption of a reinvigorated and more determined housing and slum clearance policy.

Mr. NEVILLE CHAMBERLAIN said, that nobody would grudge the expenditure of very much larger sums on housing if he were satisfied that they were being usefully employed, but in this case it was practically certain that the money would not benefit those who were crying for cheaper houses, but would merely be distributed in some way throughout the various branches of the building industry. The Government were entitled to put their ideas to the test of practice, and having made his protest he (Mr. Chamberlain) felt disposed to see whether hard experience would not bring the conviction which solid argument had failed at present to do.

Lieut.-Col. FREMANTLE said that hon. Members should think for a moment of the gigantic amount of money which was being spent upon subsidies and on housing. He would not object if they were getting their money's worth, but he was bound to say as a medical officer of health, that there were any number of practical health schemes being turned down because they would cost perhaps £1,000,000, £2,000,000 or £500,000. Yet the Government were now proposing to increase the housing subsidy to the extent of £6,000,000 a year. All medical officers recognised the gravity of the housing question, and that by improving the housing of the working classes they could do more than in any other way, with the exception of education, to prevent ill-health in future generations. But they must consider the cost.

Dr. MORGAN said they had just listened to a speech from one who belonged to the same profession as himself, and the Committee would excuse him if he said at the outset that they had in politics two opposite views in the medical profession—the one reactionary, and the other progressive.

Lieut.-Col. FREMANTLE: Which is which?

Dr. MORGAN said he had listened with great care to what Col. Fremantle had said, and he would excuse him if he said as another member of a profession in which they were accustomed to conciseness, definiteness, and order, that he was surprised at the vagueness, indefiniteness, and almost incoherency of what he had just said. The bulk of what Col. Fremantle had just said meant that the housing policy which was being proposed that day—a policy which was put into operation for a considerable time by the Government which Col. Fremantle supported—was an extravagant one. Col. Fremantle said that the expenditure on housing now proposed was wrong. The late Minister of Health had asked the question: "Is the subsidy always to go on?" The Labour Party's answer was: "Yes, as long as overcrowding goes on." The report of the Special Committee appointed by the National Housing and Town Planning Council, stated that the Glasgow slums were described in the annual report of the Scottish Board of Health for 1926. The Commission appointed to hold the local inquiry wrote, among other things, that it was impossible to draw any picture which could adequately describe the conditions under which they found human beings living in practically the whole of the houses which they inspected. There were, it was true, differences in degree, but all were hopelessly unfit for habitation . . . . . Damp was present everywhere, the walls and ceilings in a large number of houses being literally soaking. Everywhere they noticed an almost total lack of sanitation, conveniences being few, and for the most part out of repair, and in some cases leaking down the stairs and even into the houses. . . . . A very revolting feature of the slums was that the majority of the houses were infested with bugs. . . . . The Labour Party knew of these conditions, and that was why they wanted money spent on housing. The policy of the Government was not extravagant. They wanted the Minister of Health to increase the subsidy still further, and to see that more houses were built.

The Resolution was agreed to.

HOUSE OF COMMONS.

THURSDAY, JULY 11TH.

Thefts of Dangerous Drugs.

Mr. GEORGE OLIVER asked the Home Secretary whether his attention had been drawn to the number of thefts of drugs from motor cars belonging to doctors; and whether, in view of the increasing number of this class of theft and the consequent dangers arising therefrom, he proposed to take any steps to prevent medical practitioners leaving dangerous drugs unattended or in other than some reasonably safe place.—Mr. CLYNES replied: Yes, Sir, there have been a certain number of such thefts, but I am informed by the police that they are satisfied that these thefts are ordinary cases of petty larceny, and have no connexion with any form of traffic in dangerous drugs. It is a little difficult to see what action I could usefully take in the matter, but it is desirable that medical practitioners and others who have these drugs in their possession should be particularly careful to avoid any risk of their being lost or stolen, and I hope the publicity which has been given to the matter will lead to greater care being taken.

Mr. OLIVER: Is the right hon. gentleman aware that 29 cases of this description have taken place during the last twelve months; that yesterday in Bolton, drugs of a similar character were stolen, and that it is stated in the press to be more than likely that a quantity sufficient to kill 20 people has found its way into the hands of children?

Mr. CLYNES: I am not aware of any occurrence of that kind, but I think that the publicity now given to the subject is likely to reduce the number.

Mr. OLIVER: Will the right hon. gentleman suggest to the medical profession that if cases of this kind increase or continue at the same rate, some method will have to be adopted of enforcing penalties; and is the right hon. gentleman aware that criminal negligence on the part of miners or railwaymen is invariably punished with imprisonment?

Mr. CLYNES: I can only add, that if the terms of my answer are not effective, further steps might be taken.

Education of Blind, Crippled, and Deaf Children.

Mr. FOOT asked the President of the Board of Education, the number of blind and crippled children in England and Wales for whom no educational provision was being made.—Sir CHARLES TREVELYAN replied: According to the returns furnished by Local Education Authorities there were, on Dec. 31st, 1928, 602 blind, and 5336 crippled children not attending any school, though it must not be inferred that in all these cases some provision has not been made for their education.

Mr. FOOT also asked for the number of deaf children of school age in England and Wales, and the number of these who were being taught in special schools or special classes for the deaf.—Sir CHARLES TREVELYAN replied: Returns furnished by local education authorities show that on Dec. 31st, 1928, there were 3935 totally deaf children of school age in England and Wales, and that of these 3464 were being taught in special schools.

FRIDAY, JULY 12TH.

Nursery Schools.

Mr. REGINALD YOUNG asked the President of the Board of Education, if he would, at an early date, give effective help for the establishment of nursery schools and regard these schools as an integral part of his educational policy.—Sir CHARLES TREVELYAN replied: I am anxious to see an expansion in the supply of nursery schools, and I am considering what steps I can most effectively take to encourage their provision.

Mr. KELLY asked for the number of nursery schools in Lancashire, and the number in England and Wales.—Sir CHARLES TREVELYAN replied: The number of nursery schools in Lancashire is four, and in England and Wales 28. In addition the Board have approved proposals for eight new nursery schools, one of which is in Lancashire, and proposals for at least five other schools, including two in Lancashire, are in contemplation.

Percentage Grants for Maternity and Child Welfare.

Mr. SIMON asked the Minister of Health, whether he was aware of the feeling among those interested in maternity and child-welfare work, that the provisions of the Local Government Act, 1929, will hamper the development of this work; and if he proposed to take the necessary steps to prevent this by restoring the percentage grant for these services.—Mr. GREENWOOD replied: I am aware that in certain quarters there is an apprehension of this kind, but I could not undertake at the present stage to introduce legislation for the continuance of percentage grants for maternity and child-welfare work. The effect of the new

system of grants on the development of the public health services will be carefully watched.

Local Hospitals and the National Radium Fund.

Sir CHARLES CAYZER asked the Prime Minister if he would consider the desirability, in connexion with the National Radium Fund, of allowing local hospital authorities to send earmarked contributions to the fund so that these might be doubled by the State grant, as was the case in connexion with the Miners' Distress Relief Fund.—Mr. GREENWOOD replied: I am afraid that I cannot undertake to adopt the hon. Baronet's suggestion, since, as was stated in the House on April 16th, the contribution from public funds towards the purchase of further supplies of radium is subject to a maximum limit of £100,000, and the equivalent of this sum has already been raised by private subscription.

Sir C. CAYZER: In view of the fact that £100,000 has been or will be contributed to this fund by the general taxpayers, does not the right hon. gentleman think that provincial hospitals have a very strong claim to receive some assistance from the central fund?

Mr. GREENWOOD: That matter is now being dealt with, and a statement will shortly be made public as to the manner in which the radium supply is to be allocated.

Deaths from Small-pox and after Vaccination.

Mr. WELLOCK asked the Minister of Health the number of deaths that had occurred during the last twelve months from small-pox and from the after-effects of vaccination respectively.—Mr. GREENWOOD replied: During the twelve months ended May 31st last, 39 deaths occurred in which small-pox appeared in the coroner's certificate or the medical certificate as the cause or one of the causes of death. In the same period there were 29 deaths which were returned as having been associated with vaccination.

Hours Worked by Mental Hospital Attendants.

Viscount ELMLEY asked the Minister of Health the number of hours worked weekly by the attendants at the Thorpe Mental Hospital; and whether he had received any reports from his inspectors regarding this matter.—Mr. GREENWOOD replied: The weekly hours of duty amount to 59¾ hours actual working time spread over five days. The attendants, however, are allowed two whole days consecutively off duty each week, and also 21 days' leave each year. These arrangements are in accordance with the recommendations of the Joint Conciliation Committee of the Mental Hospitals Association and the National Asylum Workers' Union. The answer to the last part of the question is in the negative.

Slum Clearance Schemes.

Mr. ALPASS asked the Minister of Health, in view of the dimensions of the problem of slum clearance and the urgency of dealing with the same, if he would state what steps he proposed to take to carry out that part of the policy announced in the King's Speech.—Mr. GREENWOOD replied: It is the intention of the Government to introduce legislation on this subject at an early a date as practicable.

Liquor Advertisements in Post Offices.

Viscountess ASTOR asked the Chancellor of the Exchequer if he will state the revenue derived from advertising intoxicants in the post offices for each of the last two years; and whether he will consider abolishing this revenue in the national interest.—Mr. H. B. LEES-SMITH (Postmaster General) replied: The Government has decided that liquor advertisements should be excluded from post office buildings and publications as soon as the provisions of existing agreements permit. The revenue at present derived from these advertisements is about £4000 per annum.

Census and Overcrowding Standard.

Mr. GRAHAM-WHITE asked the Minister of Health if he would cause a new standard of overcrowding to be used in the Census Reports of the Registrar-General.—Mr. GREENWOOD replied: I propose to give consideration to this among other matters which will arise in connexion with the preparations for the next census.

MONDAY, JULY 15TH.

Vivisection of Dogs.

Sir ROBERT GOWER asked the Prime Minister whether he would grant facilities during the present Parliament for the consideration of a Bill to make the vivisection of dogs illegal.—Mr. RAMSAY MACDONALD replied: I cannot undertake to give special facilities for a Bill of the nature indicated by the hon. Member. Private Members interested will no doubt use, as before, the facilities they have for testing the opinion of the House on the subject.

Education of Defective Children.

Dr. MORGAN asked the President of the Board of Education the comparative cost of educating a normal child, a blind child, a deaf child, and a mentally defective child, respectively; and whether part of this cost could be saved in future years by a judicious health expenditure in infant years by the development and extension of infant welfare centres.—Sir CHARLES TREVELYAN replied: The cost per child in an ordinary elementary school in 1927–28 was £11 15*s.* 4*d.* According to the latest statistics available, the cost (excluding loan charges) of educating a blind child is approximately £29 in a day school and £88 in a residential school, the corresponding figures for the deaf being £43 and £82, and for the mentally defective £25 and £71. The second part of the hon. Member's question raises issues which it is difficult to deal with in the limits of an answer to a question.

Mentally Deficient Children.

Dr. MORGAN asked the President of the Board of Education the total number of mentally deficient children in Great Britain now receiving education in special schools; whether he was considering further developments of such institutions in the near future; and whether the teachers were required to have special qualifications.—Sir CHARLES TREVELYAN replied: The number of mentally deficient children attending certified special schools in England and Wales for the year ending Dec. 31st, 1928, was 15,339. As regards the second part of the question, the hon. Member will be aware that a Joint Committee of the Board of Education and the Board of Control have recently presented a report which is receiving my careful consideration. I am sending the hon. Member a copy of a memorandum indicating the requirements in regard to teachers in schools for mentally defective children.

Lunacy Law Reform.

Mr. HORE-BELISHA asked the Home Secretary whether it was the intention of the Government to put into operation the recommendations of the recent Royal Commission regarding the reform of the existing lunacy law.—Miss LAWRENCE replied: This matter is under consideration, but my right hon. friend is not at present in a position to indicate when it will be practicable to introduce legislation on the subject.

Experiments on Animals.

Mr. BROMLEY asked the Home Secretary whether applicants for licences or certificates, under the Cruelty to Animals Act of 1876, for the performance of experiments on animals were required to state the number of animals they proposed to use for such experiments; whether the Home Office had any record as to the number of animals used, as distinct from the number of experiments performed, under that Act in 1927; and whether the Home Office had any record of the number of dogs and the number of cats used for experiments in 1927, under Certificate B, plus EE.—Mr. SHORT (Under Secretary to the Home Office) replied: The answer to each part of the question is in the negative. With regard to the last part, I may point out that Section 5 of the Act, which governs Certificate EE, does not distinguish between cats and dogs.

TUESDAY, JULY 16TH.

Operative Treatment of Physically Defective Children.

Duchess of ATHOLL asked the Secretary for Scotland the number of education authorities having approved schemes for the orthopædic treatment of physically defective children that included operative treatment where necessary and remedial after-care; and the number of such schemes that were provided jointly with the authorities for maternity and child welfare.—Mr. ADAMSON replied: No education authority makes independent provision for major operative treatment of physically defective children, such treatment being ordinarily carried out by the voluntary hospitals. Thirteen education authorities have approved arrangements for the treatment of deformities by massage and remedial exercises, and twenty-one education authorities have approved arrangements for treatment by orthopædic appliances. In practice all education authorities supply splints, surgical boots, and such like appliances where necessary. As regards the last part of the question, there is no scheme for orthopædic treatment provided jointly by an education authority and a maternity service and child welfare authority, though there are a number of cases in which there is coöperation between the two authorities in the use of premises.

Government and Local Government Act.

Mr. SCURR asked the Minister of Health, whether he had received representations from many important public bodies asking for the postponement of the coming into force of the Local Government Act; and, if so, whether he could make any statement on the matter.—Miss SUSAN LAWRENCE, Parliamentary Secretary to the Ministry of Health, replied: My right hon. friend has received a certain number of representations from local authorities; it is not the intention of the Government to postpone the coming into force of the Act.

Town Planning in Built-up Areas.

Mr. SCURR asked the Minister of Health whether it was his intention to introduce legislation applying the principle of town planning to built-up areas.—Miss LAWRENCE replied: My right hon. friend hopes to introduce legislation on the subject.

Highlands and Islands Medical Fund.

Sir ROBERT HAMILTON asked the Secretary for Scotland whether he could state the present condition of the Highlands and Islands (Medical Services) Fund; whether the beneficial services assisted by the fund were being in any way curtailed; and whether steps were being taken to maintain the fund on a sound financial basis.—Mr. ADAMSON replied: The war-time accumulations in the fund will be exhausted within the next few months, and the present statutory income of the fund will require to be supplemented in order that the current year's liabilities may be met. While there has been no curtailment of established services assisted from the fund, and certain expansions have been sanctioned from year to year, other desirable developments have been delayed pending reconstitution of the fund. I have the whole position under consideration, and hope to be able to submit proposals to the House on an early date.

Ophthalmic Clinics.

Mr. DAY asked the Minister of Health whether he would give particulars of any experimental or ophthalmic clinics that had been set up under the provisions of the National Health Insurance Acts during the last six months.—Mr. GREENWOOD replied: No regulations have yet been made under the National Health Insurance Acts governing the provision of ophthalmic and other forms of treatment of insured persons in clinics, and, consequently, no clinics have up to the present time been set up under the provisions of the Act. A certain number of dental and ophthalmic clinics have been set up by private enterprise, and some insured persons have elected to obtain through them treatment towards the cost of which their approved societies have contributed by way of additional benefit; but no official recognition has yet been given to any of such clinics, and their continued use as agencies for the provision of treatment to insured persons entitled to additional benefits will be conditional upon their complying with such requirements as may, in due course, be laid down by regulations under the Act.

Obituary.

HAROLD ANDREW KIDD, C.B.E., M.R.C.S. ENG.

Dr. H. A. Kidd, who died suddenly at his home in London on July 12th, was the first medical superintendent of the West Sussex Mental Hospital, better known as Graylingwell, near Chichester, and held this post for 30 years. When the hospital was opened in 1896, Dr. Kidd took personal charge not only of the clinical side, but of the organisation as a whole, and worked out the details of administration with such success that for many years Graylingwell was famous as one of the most efficiently run mental hospitals in the country. During the war, Graylingwell was converted into a military hospital, and Dr. Kidd was appointed officer commanding, with the rank of Lieut.-Colonel, R.A.M.C. The patients in residence were removed to other mental hospitals, and nearly 30,000 wounded or sick soldiers were treated at Graylingwell. Operating theatres were devised, wards were converted, apparatus was procured, and Dr. Kidd had all the responsibility connected with this great change, and afterwards the arduous task of re-conversion. He was given a C.B.E. for his services, and received praise from all who inspected the ingenious temporary arrangements.

Dr. Kidd received his medical education at St. Mary's Hospital, which he entered with a science scholarship in 1883, qualifying in 1889. He turned at once to psychiatry, taking the post of assistant medical officer at the London County Asylum at Cane Hill, which he held for seven years. As a student, and indeed throughout his life, he was a keen athlete, playing Rugby football in his youth and later cricket, tennis and golf, with more than average skill. For years a team from St. Mary's Hospital went to Chichester for an annual cricket festival organised at Graylingwell and Dr. Kidd loved to welcome past and present students of the hospital to his delightful home. Dr. Kidd was a keen freemason and was Master of the Sancta Maria lodge in 1914, coming up to London regularly for its meetings. In this way he renewed old friendships and his connexion with St. Mary's was further strengthened in recent years by the entry of his eldest son, who qualified from the hospital in 1927.

Dr. Kidd was a genial and charming host and he delighted to show visitors ignorant of the routine of a large mental hospital how much liberty was compatible with the necessary discipline. He was keen to welcome any suggestions for improving conditions and was convinced that the difficulties standing in the way of further progress were mainly economic. His constant aim was to cut down only such administrative expenses as did not contribute to the comfort of patients or staff and to make Graylingwell as far as possible a self-supporting colony with a strong team spirit. He was rewarded by the trust reposed in him by his committee and the affection with which he was regarded alike by patients, colleagues, and nursing staff throughout his career.

Medical News.

UNIVERSITY OF OXFORD.—The Radcliffe Scholarship in Pharmacology has been awarded to J. R. Braybrooks, New College, and G. S. Grist, Pembroke College, who are equal in merit.

UNIVERSITY OF LONDON: *University College.*—The following awards have been made in the Faculty of Medical Sciences:—

Entrance Scholarship: J. C. Thomas (Christ's Hospital, Horsham).

Bayliss-Starling Memorial Scholarship in Physiology: F. G Young.

Cluff Memorial Prize (Anatomy, Physiology, Pharmacology, and Chemistry): E. A. Devenish.

UNIVERSITY OF SHEFFIELD.—At recent examinations the following candidates were successful:—

M.D.—Janet Breakey.

FINAL EXAMINATION FOR M.B., CH.B., WITH HONOURS.

Class II.—Frank Ellis and T. H. Pullar.

FINAL EXAMINATION FOR M.B., CH.B.

W. H. Carlisle, Iris M. Moody, and Isaac Slesnick.

UNIVERSITY OF LIVERPOOL.—Dr. W. J. Dilling has been appointed Dean of the Faculty of Medicine, and Prof. W. H. Gilmour Secretary of the Dental Board of Studies.

SOCIETY OF APOTHECARIES OF LONDON.—At recent examinations for the Society's diploma of Master of Midwifery the following candidates were successful: B. P. Baliga, F.R.F.P.S. Glasg., C. A. Birch, M.D. Liverp., and W. C. V. Brothwood, M.B. Manch.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—A quarterly meeting of the Council was held on July 11th, with Lord Moynihan, the President, in the chair. The President announced the re-election to the Council of Sir Holburt Waring, Mr. C. H. Fagge, and Mr. W. Sampson Handley, and the election of Prof. Graham Simpson. The newly elected members were introduced and took their seats in the Council.

Lord Moynihan was re-elected President, and Mr. C. H. Fagge and Mr. V. Warren Low were elected Vice-Presidents for the ensuing collegiate year.

Mr. R. H. Burne, F.R.S. (Physiological Curator), Mr. C. F. Beadles (Pathological Curator), Sir Frank Colyer (Honorary Curator of the Odontological Collection), and Mr. C. J. S. Thompson (Honorary Curator of the Historical Section of the Museum) were re-elected to their respective posts. Mr. W. R. Le Fanu, Second Librarian to the Hellenic Society, was appointed Assistant Librarian to the College.

Mr. H. J. Burrows was appointed Beaverbrook Research Scholar of the College for 1930 and 1931. Until the end of this year he will pursue tissue culture research at the Research Hospital, Cambridge. The Hallett Prize was awarded to Mr. L. A. Riddell, M.B. New Zealand, for the recent examination in Anatomy and Physiology for the Fellowship.

The Council elected the following Professors and Lecturers for the ensuing year:—

Hunterian Professors.—Sir John Rose Bradford, P.R.C.P., Mr. Victor Bonney, Mr. J. H. Fisher, Mr. G. E. Gask,

Mr. W. Sampson Handley, Sir Arthur Keith (six lectures) and Mr. Geoffrey Keynes.

Arris and Gale Lecturers.—Mr. W. McAdam Eccles, Mr. E. R. Flint, Mr. R. H. O. B. Robinson.

Erasmus Wilson Lecturers.—Mr. C. E. Shattock and Mr. C. P. G. Wakeley.

Arnott Demonstrator.—Sir Arthur Keith.

Dr. John Eyre, bacteriologist at Guy's Hospital, was appointed Examiner for Part I. of the Examination for the Diploma in Public Health.—Lord Moynihan presented to the College a portrait-group of the Council in 1927–28, painted by Mr. Moussa Ayoub.—It was decided to have printed Plarr's "Lives of the Fellows," which have been edited by Sir D'Arcy Power, with the assistance of Mr. W. G. Spencer and Prof. G. E. Gask; and a guide to the Historical Section of the Museum prepared by Mr. C. J. S. Thompson.

The Fellowship of the College was conferred on R. L. Almond, and the Membership on V. L. Misso and R. M. Sargent, who had passed the necessary examinations and complied with the regulations.

Licences in Dental Surgery were granted to the following:

N. L. Barber, S. W. Beales, R. G. Boodle, D. S. Clogg, Marcus Cohen, F. N. Corfe, F. L. Crameri, J. P. Davies, W. F. Goddard, W. B. Harris, H. T. Honeybourne, G. E. S. Jeffery, S. R. Johns, R. E. L. Jones, F. F. Kennedy, J. J. D. King, J. F. Lockwood, A. A. Mallet, R. H. Marthews, J. I. Mathias, C. E. B. Maytum, David Monk, C. G. Moore, R. O. Murray, A. B. Nielsen, C. A. Pank, D. L. Parkes, William Peebles, H. E. Pickering, J. E. D. Pollard, T. W. E. Pugh, J. C. Read, L. G. Rowe, L. A. Sewell, P. R. Shepherd, Samuel Sidebotham, H. F. Strickland, W. L. Sutcliffe, C. A. Tinn, and A. L. Wraight.

The following diplomas were granted jointly with the Royal College of Physicians of London:—

Diploma in Psychological Medicine.—Leonard Barber, Flora H. MacD. Calder, Viola C. Cameron, Ruby T. Carr, S. W. Davies, J. H. Ewen, E. A. Haslam-Fox, J. E. S. Lloyd, S. V. S. Rao, and Kathleen M. Todd.

Diploma in Laryngology and Otology.—B. R. Chaudhri, Patrick Hickey, G. J. Hutchison, Rajnarain Kacker, W. A. Kerr, K. S. May, R. F. Paterson, C. L. Rosenfield, and Gobind Vaishnavi.

ST. THOMAS'S HOSPITAL.—An address and a sum of money from past and present students will be presented to Robert Hopkins, Bedell of the Medical School of St. Thomas's Hospital, at the annual dinner on Oct. 4th, to celebrate his fiftieth year in the service of the School.

BEIT MEMORIAL FELLOWSHIP FOR SCIENTIFIC AND MEDICAL RESEARCH.—At the last meeting of the Trustees of this establishment the report of the hon. sec., Sir J. Kingston Fowler, alluded to the frequent resignation of the Fellowship as a practical tribute to the status of those who were selected for them, inasmuch as it meant the appointment of the Fellows to permanent posts.

The following were elected to Fourth Year Fellowships:—Richard J. Lythgoe (Electric reactions in connexion with special nerves) and Maurice W. Goldblatt (carbohydrate metabolism).

The following elections have been made to Junior Fellowships, the subjects of research being announced:—

Robert Hill (from the Biochemical laboratory, Cambridge), specificity of hæmoglobins.

Ann Bishop (from the Molteno Institute for Parasitology, Cambridge), completion of studies on the morphology and development of Trichomonas of man and monkeys in culture.

Cuthbert Leslie Cope (from the Radcliffe Infirmary and Physiological and Biochemical Laboratories, Oxford), the diuretic responses of normal and pathological kidneys in man to tubule diuretics, especially to intravenous sodium sulphate.

Leonard Ernest Bayliss (from the department of Physiology and Biochemistry, University College, London)., the metabolism of the isolated heart and kidney by means of the heart-lung and heart-lung-kidney preparation and the artificial oxygenator of Bayliss, Fee, and Ogden.

Walter Phillips Kennedy (from the Physiology Department and Royal Infirmary, Edinburgh), investigations into the function of the Ovary, including *in vivo* and *in vitro* actions of oestrin and the hormone of corpus luteum. The research is now in progress.

Eric Boyland (from the Lister Institute), investigation of the mechanism of carbohydrate metabolism.

Edwin Martin Case (from the Sir William Dunn Institute of Biochemistry, Cambridge), the study of the metabolism and thermodynamics of muscle. This research is already in progress.

Kenneth A. C. Elliott (from the Biochemical Laboratory, Cambridge), the study of biological oxidations.

Margaret Honora Roscoe (from the Lister Institute), continuation of the investigation begun in conjunction with Dr. Aykroyd (Aykroyd, 1929) on the distribution of the anti-pellagra vitamin B2 in natural foodstuffs and a comparison with the distribution of the anti neuritic vitamin B1. The methods of vitamin assay will be those described by Chick and Roscoe (1928, 1929) using the growth of rats as criterion. The distribution of the antineuritic vitamin has hitherto only been studied in connexion with the prevention and cure of polyneuritis in birds. 2. Investigation of possible synthesis of vitamin B1 and B2 in the intestine, as the explanation of the phenomenon of infection described by Fridericia of Copenhagen (1926) and Roscoe (1928). Study of the anti-pellagro vitamin B2 in connexion with the antineuritic vitamin B1.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.

MONDAY, July 22nd.—2.30 to 5 P.M.: Medical, Surgical and Gynæcological Clinics. Operations.

TUESDAY.—2.30 to 5 P.M.: Medical, Surgical, Ear, Nose and Throat Clinics. Operations.

WEDNESDAY.—2.30 to 5 P.M.: Medical, Skin, and Eye Clinics. Operations.

THURSDAY.—11.30 A.M.: Dental Clinics. 2.30 to 5 P.M.: Medical, Surgical, Nose, Throat, and Ear Clinics. Operations.

FRIDAY.—10.30 A.M.: Throat, Nose and Ear Clinics. 2.30 to 5 P.M.: Surgical, Medical, and Children's Diseases Clinics. Operations.

ST. PAUL'S HOSPITAL, Endell-street, W.C.

THURSDAY, July 25th.—4.30 P.M., Mr. Kenneth Walker: The Enlarged Prostate.

Appointments.

BAKER, Doris, M.D., M.R.C.P.Lond., has been appointed Assistant Physician to the South London Hospital for Women, Clapham Common.

COTTRELL, J., M.B., Ch.B. Edin., Certifying Surgeon under the Factory and Workshop Acts for Grimsby.

GAVIN, F. W., M.D., Ch.B. Edin., D.P.H., Asst. M.O.H. and School M.O. for Croydon.

St. Thomas's Hospital: COOKE, A. M., B.M., B.Ch. Oxf., M.R.C.P.Lond., Deputy Director of the Medical Unit; CHIESMAN, W. E., M.B., B.Chir. Camb., M.R.C.P.Lond., First Assistant to the Medical Unit; JONES, B. H., M.D., B.S. Lond, M.R.C.P.Lond., Resident Assistant Physician.

ILFORD, Borough of: EDGECOMBE, K., M.D., Ch.B., D.P.H. Liverp., Assistant Medical Officer of Health; and CROW, A. F., M.B., Ch.B., L.D.S., Assistant Dental Surgeon.

Vacancies.

For further information refer to the advertisement columns.

Ashton-under-Lyne District Infirmary.—Asst. Radiologist. £500.

Barnsley, Beckett Hospital and Dispensary.—Jun. H.S. £140.

Birkenhead General Hospital.—Cas. S. £100.

Birmingham City Mental Deficiency Institution, Coleshill Hall.—Med. Supt. £700.

Birmingham, General Hospital.—Res. H.P £70. Also Second Asst. Visiting Anæsthetist. £50.

Birmingham University.—Lecturer in Physiological Dept. £400.

Birmingham Union, Erdington House.—Res. Asst. M.O. £250–£350.

Bootle Borough Hospital, Derby-road.—Sen. M.O. Also Two Jun. M.O.'s. At rate of £150 and £125 respectively.

Birmingham and Midland Eye Hospital, Church-street.—Res. Surg. O. Also Two H.S.'s. £150 and £110 respectively.

Bradford Children's Hospital.—H.S. Also H.P. Each £120.

Bradford Royal Infirmary.—Two H.S.'s. Each £150.

Bristol General Hospital.—H.P.'s and H.S.'s. Also Obstetric Officer. Each at rate of £60. Also Cas. H.S. At rate of £80.

British Red Cross Society's Clinic for Treatment of Rheumatic Diseases, Park Square East, Regent's Park.—Med. Supt. £600.

Burton-on-Trent General Infirmary.—2nd Res. H.S. £150.

Buxton, Devonshire Hospital.—Asst. H.P. At rate of £150.

Cairo, Egyptian University.—Prof. of Clinical Pathology. £E.1500.

Chester Royal Infirmary.—H.S. and Cas. O. £120.

Coventry and Warwickshire Hospital.—Res. H.S. £125.

Croydon Mental Hospital, Upper Warlingham.—Second Asst. M.O. £350.

Derby, Derbyshire Hospital for Women.—Hon. Asst. S. Also H.S. At rate of £150.

Devonport, Royal Albert Hospital, &c.—Asst. H.S.'s. At rate of £50.

Dewsbury and District General Infirmary.—H.S. £200.

Doncaster Royal Infirmary.—H.S. £150.

Dudley, Guest Hospital and Eye Infirmary.—H.S. £150–£175.

Dundee Royal Infirmary.—Visiting M.O.

Durham County and Sunderland Eye Infirmary.—Locum.

East Ham Memorial Hospital, Shrewsbury-road, E.—Res. M.O. At rate of £150.

Evelina Hospital for Children, Southwark, S.E.—H.S. At rate of £120.

Exeter, Royal Devon and Exeter Hospital.—Asst. H.S. At rate of £100.

Exminster, Devon Mental Hospital.—Jun. Asst. M.O. £300.

Gloucester, Gloucestershire Royal Infirmary, &c.—Second H.S. At rate of £100.
Great Yarmouth General Hospital.—Jun. H.S. £100. Also Sen. H.S. £150.
Hull and Sculcoates Dispensary.—M.O. £500.
Hull Royal Infirmary.—Cas. H.S. At rate of £130.
Indian Medical Service.—Commissions.
Liverpool, St. Paul's Eye Hospital, Oldhall-street.—H.S. £60.
London Temperance Hospital, Hampstead-road, N.W.—Cas. O. At rate of £120.
Longton Hospital, Stoke-on-Trent.—H.S. £120.
Lowestoft and North Suffolk Hospital.—H.S. £120.
Macclesfield General Infirmary.—Res. H.S. £180.
Manchester City.—Asst. Tuberculosis Officer. £650.
Manchester, Royal Eye Hospital.—Jun. H.S. £120.
Miller General Hospital, Greenwich-road, S.E.—Hon. P. to Skin Dept.
Nottingham City Education Committee.—Sen. Asst. School M.O. £600.
Philadelphia, Hospital of the Woman's Medical College.—Hospital Resident.
Plymouth, City and Port of.—Asst. M.O.H. £600.
Plymouth Poor-law Institution.—Res. Locum Tenens.
Plymouth, Udal Torre Sanatorium, Yelverton.—Res. M.O. £450.
Prince of Wales's General Hospital, Tottenham, N.—Hon. Asst. P.
Queen Mary's Hospital for the East End.—Hon. Asst. Radiologist.
Radcliffe-on-Trent, Notts County Mental Hospital.—Sen. Asst. M.O., &c. £520.
Rotherham Hospital.—Sen. H.S. £200.
Royal Army Medical Corps.—25 Commissions.
St. Mary's Hospital for Women and Children, Plaistow, E.—Res. and Asst. Res. M.O.'s. At rate of £175 and £120 respectively.
Salisbury Municipality, S. Rhodesia.—M.O.H. £900.
Sheffield Royal Infirmary.—Surg. Reg. £200. Also Asst. Cas. O. H.S., Ophth. H.S., and Asst. Ophth. H.S. Each at rate of £80.
Society of Apothecaries of London, Water-lane, Queen Victoria-street, E.C.—Examiner in Midwifery.
Southampton, Royal South Hants and Southampton Hospital.—Cas. O. At rate of £120.
Stafford, Staffordshire General Infirmary.—H.S. At rate of £200.
Stockport Infirmary.—H.S. £175.
Swansea Hospital.—Cas. O. £150.
West London Hospital, Hammersmith, W.—Res. Anæs. At rate of £100.
West Riding C.C., Yorkshire.—Temporary Pathologist. £750.
Willesden General Hospital, N.W.—Two Clin. Assts. to Special Departments. Also Ophthalmic Surgeon.
Winchester, Royal Hampshire County Hospital.—Res. H.S. £150.
Worcester County and City Mental Hospital, Powick.—Jun. Asst. M.O. £350.
Worthing Hospital.—H.S. At rate of £150.

The Chief Inspector of Factories announces the following vacant appointments for Certifying Factory Surgeons: Addingham (York, W.R.), Uffculm (Devon), Haverhill (Suffolk), and Clwt-y-bont (Cærnarvonshire).

Births, Marriages, and Deaths.

BIRTHS.

CALVERT.—On July 12th, 1929, to Nancy (*nee* Marsden), wife of Dr. E. G. B. Calvert, 132, Harley-street, W.—a son.

DUCHESNE.—On July 10th, at "Langton," Swanage, Dorset, the wife of H. W. Duchesne, L.D.S., R.C.S.Eng., of a son.

MARRIAGES.

MARTEN—MONTEITH.—On July 6th, at Christ Church, Westminster, Robert Humphrey Marten, M.D., of Adelaide, South Australia, and Artillery Mansions, S.W., to Mary Elizabeth, elder daughter of the late Charles Dickey Monteith and Mrs. Monteith, of Carlton-hill, Exmouth.

REEVES—ENGLISH.—On July 13th, at St. Matthew's, Westminster, Guy Kingham Reeves, L.R.C.P.Lond., M.R.C.S. Eng., of Tulse-hill, S.W., to Audrey Malcolm English, of Poynders-road, S.W.

RUSSELL—WATERS.—On July 10th, at St. Mary Magdalene's Church, Westerfield, Henry Stewart Russell, B.Sc., M.B., Ch.B., to Betty Coyne Waters, B.A.Cantab., M.B., B.S., elder daughter of Mr. and Mrs. H. E. Waters, Westerfield, Suffolk.

DEATHS.

BISHOP.—At Bathurst, Gambia, West Africa on 20th May, 1929, Thomas Bishop, L.R.C.P.E., &c., J.P. and Coroner, aged 61.

BURY KNIGHT.—On July 10th, at Wooldown, Marhamchurch, Bude, Henry Bury Knight, M.R.C.S., L.R.C.P., aged 58.

CROOK.—On July 11th at Dumpton Cottage, Park-avenue, Broadstairs, Herbert Evelyn Crook, M.D.Lond., F.R.C.S. Eng., Barrister-at-Law of the Middle Temple, aged 64.

IRVING.—On July 12th, at Bedford, Major Henry Court Irving, L.R.C.P., L.R.C.S., late of British Guiana Medical Service, aged 68 years.

KIDD.—On July 11th, suddenly, at Addison Court-gardens W., Harold Andrew Kidd, C.B.E., late Medical Superintendent, Graylingwell Mental Hospital, Chichester, and late Lieut.-Col. R.A.M.C., aged 65.

MALING.—On Tuesday, July 9th, at St. Monica's, Micheldever-road, Lee, George Alan Maling, V.C., M.A., M.B., B.Ch. Oxon., aged 40 years. Interment at Chislehurst Cemetery.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

FOUR MILLENIUMS OF CHINESE MEDICINE.

BY K. C. WONG.

To the uninformed the term Chinese medicine conveys either a dark picture of charms, incantations, and magic, or one of disgusting concoctions, painful manipulations, unsightly plasters, and worthless remedies. Everywhere, however, superstition and healing are so closely related that it may be impossible to draw a line between them, and while there are quacks in China just as in other countries, the Chinese regular practitioner treats diseases according to rules and standards and has a clear conception of the responsibilities of his calling. From a mass of folly and nonsense there has been produced a rational, semi-scientific, and dignified empirical practice, which is based upon the accumulated knowledge of 40 centuries and which represents the thoughts and experiences of many bright minds. Chinese medicine as it exists at the present time is comparable to the situation of medicine in Europe during the sixteenth century, and viewed from the historical standpoint, it was at least equal to, if not more profound than, that of other countries at the same period. It certainly merits deeper investigation than it has heretofore received, when it will earn greater appreciation. Many books and very many articles have been written on the superstitions of Chinese medicine, but its more scientific aspects have scarcely been touched upon. The present short sketch attempts to deal more particularly with its proper position in history, its value and defects, and its relation to scientific medicine. In this brief survey no attempt will be made to give full references for the conclusions arrived at; only the outline of the medical conception of the various dynasties will be drawn.

FOUR EPOCHS.

Four distinct epochs may be distinguished: (I.) From the dawn of history to the end of the Shang Dynasty, 1154 B.C., may be termed the legendary period. Thereafter the accounts were more authentic and the legendary developed into the historical. (II.) Beginning with the Chow and ending with the Tang Dynasty (1000 B.C. to A.D. 959) may be styled the historical or classical period. Chang Chung king, the Hippocrates of China, and Hua To, the most celebrated surgeon, lived late in the middle of this period—viz., A.D. 195. (III.) From the eleventh to the seventeenth century there was a marked change in Chinese medical thought. Instead of the pedantic worship of the ancients the publications of this period are mostly controversial in character, old writings being attacked as well as current opinion. Four schools were recognised and subsequent writers all revolved round these different schools. This period may be called the mediæval or controversial period. (IV.) With the introduction of Western medicine in A.D. 1805 came the modern or transitional period. The most prominent feature of this period is the struggle for supremacy between the old and the new. The latter, however, is slowly and steadily gaining ground. Though it may take some time the dawn of another golden era is looming large on the medical horizon of China.

I. THE ANCIENT OR LEGENDARY PERIOD.

There are many legends concerning the founders of Chinese medicine. The first was Sheng Nung, 2737 B.C., the originator of the Materia Medica. Like Mithridates, King of Pontus, who achieved a reputation in the art of taking poisons, he has said to have tasted 70 different kinds of poison every day and established the art of pharmacology. To him is usually ascribed the writing of the Pentasso great Herbal which is supposed to be the earliest Chinese scientific work. Sheng Nung is venerated as the Father of Medicine. Another noted and nearly contemporary figure in Chinese healing art was Prince Hwang Ti, 2697 B.C. In conjunction with Chi Pok, one of his Ministers, he was said to have written the famous Nei Ching or Canon of Medicine. But historical researches prove that this important medical classic was not composed by him but was a later production written probably about 1000 B.C. What the Four Books are to the Confucianists the Nei Ching is to the native doctors. Upon it is built most of the indigenous medical literature of China, and so important is it considered by medical men that even at the present time, 3000 years after it was written, that it is still regarded as the greatest authority, though it is the oldest Chinese treatise on medicine proper extant. It has been translated in

French by Dabry. A third name to be mentioned in this legendary period is I Yin, the able and faithful Prime Minister of Emperor Tang, founder of the Shang Dynasty, 1783 B.C. He is credited with the discovery of making medicinal decoctions.

As with the early civilisations of other countries religion and astrology merged into healing, so in China the medical profession was from the earliest times under the sway of priestcraft and sorcery, and it was not until the Chow Dynasty, 1140 B.C., that the functions of these two professions were separated. An interesting sidelight on this situation is thrown by the formation and development of the ancient written character for doctor. It is composed of three parts; at the top and left corner is a quiver, at the right corner a spear, and below is the symbol common to sorcerer or priest. The significance is that the priest employs strong weapons to kill or expel the demons of disease. Later this last symbol was changed to that for wine, signifying that the profession was no longer in the hands of the priests but had passed to the regular doctors who administered wines (elixirs) to their patients. A study of the archaic writing of Chinese characters will throw much light on the medical conditions of the various periods.

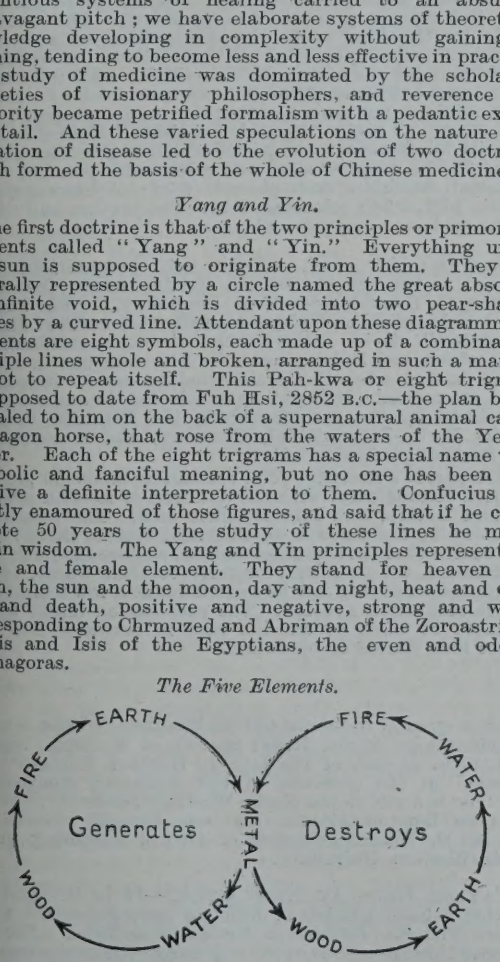
II. The Historical or Classical Period.

Documented history does not extend further back than the middle of the Chow Dynasty, 722 B.C., one of the most glorious periods in Chinese history. Literature, art, philosophy, government, religion, and all that is included in the term civilisation flourished and reached a high degree of development. Laotzu, Confucius, Mencius, and most of the famous philosophers lived during this period, and these men speculated on all things, and their influence was so great that it was felt in every branch of literature. But, as a result, we find medicine no longer an effective practical although restricted art based upon observation and knowledge. We see rather, masquerading under its name, pretentious systems of healing carried to an absurdly extravagant pitch; we have elaborate systems of theoretical knowledge developing in complexity without gaining in meaning, tending to become less and less effective in practice. The study of medicine was dominated by the scholastic subtleties of visionary philosophers, and reverence for authority became petrified formalism with a pedantic excess of detail. And these varied speculations on the nature and causation of disease led to the evolution of two doctrines which formed the basis of the whole of Chinese medicine.

Yang and Yin.

The first doctrine is that of the two principles or primordial elements called "Yang" and "Yin." Everything under the sun is supposed to originate from them. They are generally represented by a circle named the great absolute or infinite void, which is divided into two pear-shaped bodies by a curved line. Attendant upon these diagrammatic elements are eight symbols, each made up of a combination of triple lines whole and broken, arranged in such a manner as not to repeat itself. This Pah-kwa or eight trigrams is supposed to date from Fuh Hsi, 2852 B.C.—the plan being revealed to him on the back of a supernatural animal called a dragon horse, that rose from the waters of the Yellow River. Each of the eight trigrams has a special name with symbolic and fanciful meaning, but no one has been able to give a definite interpretation to them. Confucius was greatly enamoured of those figures, and said that if he could devote 50 years to the study of these lines he might attain wisdom. The Yang and Yin principles represent the male and female element. They stand for heaven and earth, the sun and the moon, day and night, heat and cold, life and death, positive and negative, strong and weak, corresponding to Chrmuzed and Abriman of the Zoroastrians, Osiris and Isis of the Egyptians, the even and odd of Pythagoras.

The Five Elements.



The second doctrine is the five elements which are metal, wood, water, fire, and earth. The human frame is supposed to be made up of a harmonious mixture of these primordial substances. So long as the proportions remain proper, health exists: but if the balance is disturbed, disease follows. The five elements again interact on one another, thus:—

Metal	generates	water;	destroys	wood.
Water	,,	wood;	,,	fire.
Wood	,,	fire;	,,	earth.
Fire	,,	earth;	,,	metal.
Earth	,,	metal;	,,	water. (See figure.)

Corresponding with the five elements are the five organs—spleen, liver, heart, lungs, and kidneys—which are further related in a complex system of arrangements to the planets, colour, taste, climate, &c., according to the following scheme:—

	Organ.	Planet.	Element.	Colour.	Taste.	Climate.	Direction.
1	Heart.	Mars.	Fire.	Red.	Bitter.	Hot.	S.
2	Liver.	Jupiter.	Wood.	Green.	Sour.	Windy.	E.
3	Spleen.	Saturn.	Earth.	Yellow.	Sweet.	Moist.	C.
4	Lungs.	Venus.	Metal.	White.	Pungent	Dry.	W.
5	Kidney.	Mercury.	Water.	Black.	Salt.	Cool.	N.

S = South; E = East; C = Centre; W = West; N = North.

This reminds us of the humoral pathology of the Greeks, the Chinese system, however, being more complicated.

Classical Medicine.

Turning to the more strictly medical aspects of the classical epoch, the first authentic doctor who practised medicine and surgery appears to have been Pien Chiao, who lived about 255 B.C. Round him legends cluster. It is said that he could see through the human body, all diseases of internal organs being revealed—an anticipation of the X rays. In the Lietsz the following story is related. Ching Wu of Lu and Tsi Ying of Chao were sick, and both asked Pien Chiao to treat them. He gave them a narcotic wine to drink which made them unconscious for three days. He opened their chests, exchanged their hearts, and when they awoke they felt as before, and took leave and returned home. This is the earliest record of the use of anæsthetics in China. But Pien Chiao is also regarded as the first exponent of taking the pulse which is considered indispensable by native doctors in diagnosis.

Massage has been practised in China from time immemorial. Its value is fully recognised, and in the Tang Dynasty it was elevated as a science, formed one of the seven departments of medicine, and at universities a special chair of massage was established with a professor in charge of it. But after the Sung Dynasty the practice degenerated till at the present day it is mostly in the hands of the barbers and the blind.

Acupuncture is a very old Chinese method. On the body 367 points of puncture are described, and more harm than good is done by its practice as asepsis is unknown to native doctors. The use of acupuncture spread early to Japan and, according to Remusat, it was introduced into Europe by Ten-Rhyne, a Dutch surgeon, at the end of the seventeenth century and was much extolled in France early in the nineteenth century. The late Sir James Cantlie and others tried it on sprains of joints and in chronic rheumatism and reported very favourably on it, and with further investigation it might prove a useful addition to our armamentarium. In the Imperial Academy of Medicine at Pekin there is still to be found a copper model of the human figure pierced with holes at the proper places for puncturing. The model is covered with paper and the student practises needling to discover a particular hole.

Anatomy and Dissection.—Because of the great reverence for the dead, human dissection was seldom attempted; hence gross mistakes are found in the Chinese conceptions of anatomy and physiology. But dissection was described in 2697 B.C. In the Lin Shu it is stated that after death the body may be dissected and observations made as to the size of the organs, the capacity of the intestines, the length of the blood-vessels, and so on. In the Han Dynasty Emperor Wang Mang captured a revolutionary and ordered his physician to dissect his body. Measurements were made of the internal organs and bamboo rods were inserted into the blood-vessels to see where they began and when they ended. Many records of this nature are in ancient literature, and about 2000 years before Harvey made his discovery of the circulation of the blood, the Chinese made a near guess at the story. For we find the following significant passages in the Canon of Medicine: "All the blood is under the jurisdiction of the heart. The 12 blood-vessels are deeply hidden between the muscles and cannot be seen. Only those on the outer ankles are visible because there is nothing to cover them in these places. All other blood-vessels on the surface of the body are 'loh' vessels (veins). The harmful effects of wind and rain enter the system first through the skin. It is then conveyed to the 'sun' vessels

(capillaries). When these are full it goes to the 'loh' vessels (veins), and these in turn empty into the big 'chin' (arteries). The blood current flows continuously in a circle and never stops."

Examinations.—State medical examinations were held in China as early as the tenth century B.C. In the Chow rituals it is stated at the end of each year the work of the doctors was examined and the salary of each fixed according to the results shown.

Hygiene, General and Personal.—Sanitation was in a comparatively advanced state throughout much of this period. Wine-drinking was prohibited. The law against it was as stringent as the present prohibition laws are in the United States of America. There were special doctors to look after food and drink, dietitians, physicians, surgeons, and veterinary surgeons being the four classes of doctors. Temperance in the broad sense of the word was strongly advocated. The value of exercise was recognised. From experience the medical profession learned many laws of eugenics, though their real meaning was imperfectly understood, Many very sensible rules were laid down for prenatal care.

Hospitals.—These were established more than 600 years before the celebrated Basilian monasteries, yet in spite of such a good start the Chinese were slow to push their investigations into disease further; on the contrary, they lost sight of many of the valuable discoveries left them by their predecessors.

(To be continued.)

NEW CATALOGUE OF LEWIS'S LIBRARY.

THE new catalogue of Lewis's medical and scientific circulating library (136, Gower-street, London, W.C.1), which has proved indispensable to generations of students and medical men, has now been issued, revised to the end of December, 1927. It is published in two parts, conveniently bound together, of which the first (408 pages) is devoted to authors and titles arranged alphabetically and the second (166 pages) is a classified index of subjects with the names and initials of those authors who have written on them. To meet a suggestion made by critics of the last edition of the catalogue, now more than ten years old, the publishers state in a note to Part II. that authors' initials have been added to facilitate reference to the body of the catalogue. Unfortunately these are not uniformly supplied, and seem to be omitted in an undue proportion of foreign names where they are perhaps most needed. This is almost the only disappointment we have had in examining a catalogue that will be welcomed not only by subscribers but by men of science throughout the empire. In medicine and its allied sciences at least, it provides a list of publications in each subject which includes all the important works published in the English language. A bi-monthly list of new books and new additions is issued, so that subscribers are kept up to date. It is worth remembering that surplus copies of books withdrawn from circulation are offered at reduced prices. The catalogue is available to subscribers at 7*s.* 6*d.* and to non-subscribers at 15*s.*

NEW PREPARATIONS.

OLEOCAL: DRAGEES AND GRANULATE (Messrs. Wilcox, Jozeau and Co., Ltd., 15, Great St. Andrew-street, London, W.C.)—These two preparations of cod-liver oil in concentrated and solidified form are claimed by the Laboratoire des Produits Scientia, Paris, to contain the vitamins A, B, and D, salts of iron, and calcium and phosphorus. The great advantages of a form of supplying cod-liver oil which may be taken in all seasons and all climates with ready toleration need not be insisted upon. For adults the dose is 6 to 10 dragees, or 3 to 5 teaspoonfuls of the granulate each day in three doses with meals; for children the recommended dosage is 3 to 6 dragees according to age, or 1 to 3 teaspoonfuls of the granulate. The preparation may be broken up in the mouth or swallowed whole.

BAKOLYSE.—This preparation is distributed by the Anglo-French Drug Company, Ltd., 238A, Gray's Inn-road, London, W.C., and manufactured at the Sauvin laboratories in Paris, in accordance with the formula of Dr. Hervouet. It is a solution of amino-acids and creatinin for injection and in the hands of French physicians appears to have met, with success. The ampoules are supplied in boxes of ten, while the average dose is two ampoules weekly, the physician, however, watching the method of administration. The preparation is designed for states of malnutrition, especially tuberculosis. The formula seems to be a perfectly logical one, but the information supplied with the samples is not impressive.

ARCOLAX.—Messrs. Roberts and Co., 76, New Bond-street, London, W., call our attention to the properties of the seeds of psyllium plantago, which are sold by them under the name of Arcolax. The plant is found in the native state in many parts of the Mediterranean littoral, and the shining inodorous and tasteless little psyllium seeds, when ingested, expand to approximately four times their original volume. A quantity of mucilage is poured out, while the oil of the seeds is emulsified and fitted for absorption. The claim is that as a result, and without any interference with normal action, the mucous membrane of the intestine is lubricated and defæcation facilitated. Care has been taken that the seeds are sold in a clean state, and free from extraneous matter. The recommended dose for commencing a course of treatment for constipation is one teaspoonful, more or less as found necessary, in two or three times that quantity of water at bed-time. Arcolax is sold in boxes containing sufficient seeds to last a fortnight, if taken with the above dosage, while a point of some value is that the dose can be gradually reduced, and the times of administration spaced out until the preparation can be dispensed with.

PLASMONA.—This preparation, which is manufactured by Plasmon, Ltd., 66A, Farringdon-street, London, E.C., was analysed by us, and reported upon as recently as Dec. 15th last year. It claims to be a blood and nerve food containing the anti-anæmic principle of liver combined with lipoic compounds, together with the vitamin factors A, B, D, and E. We are informed that by a new process of manufacture a pleasant flavour is now imparted to the preparation, while its full strength is preserved. It may be mixed with either cold or warm milk, but boiling liquids should not be used as they destroy the efficacy of the preparation, which may be taken in place of tea, coffee, or cocoa.

GENOZO TOOTH PASTE.—We have received from Genatosan, Ltd., of Loughborough, Leicestershire, a specimen of this tooth-paste, which is designed to be antiseptic and therefore a preventive of pyorrhœa. The statement made by the firm as to the composition of a bacterial emulsion called Genovax is as follows: Streptococci 15,000 millions per c.cm.; *M. catarrhalis;* 2000 millions per c.cm.; staphylococci, 2000 millions per c.cm.; *B. proteus* 1000 millions per c.cm.; antiseptic content phenol, 0·5 per cent. Genovax is the "bacterial emulsion" alluded to in the formula for Genozo tooth-paste, which is given as glycerinum, 47·65; magnes. silic. and calcii carb. præcip., 49·22; bacterial emulsion and phenol, 0·76; ol. limonis and ol. menth. pip., 2·36; colouring, 0·01. The texture and flavour of the paste are very agreeable.

DIGIPAN; SICCOPAN.—These two preparations have reached us through the British agents, Messrs. Coates and Cooper, 41, Great Tower-street, London, E.C. For Digipan, which is described as "physiologically standardised digitalis glucosides," it is claimed that through uniformity of composition and keeping qualities the drug can be used in a safe manner when the familiar indications for its employment are present. It is put up in solution, in ampoules, and in tablets by the manufacturers, the Temmler Chemical Works Berlin-Johannisthal, Germany, and is supplied to the medical profession only.

Siccopan is a nutritive food containing about 60 per cent. of dried hæmoglobin, with the addition of lecithin albumin, calcium lactate, and soluble silicic acid. The preparation is put up by the Sicco A.-G. Chemical Works, Berlin, which firm states that the slaughter-houses, whence the fresh blood is obtained, are in close proximity to their works, so that the process of drying can be carried out at a low temperature and fermentation avoided. The preparation might well be valuable in cases of anæmia and in convalescence after severe long illness or operation.

AT a special meeting of the Members of the Section of Odontology of the Royal Society of Medicine, held on July 17th, a bust of the late J. Howard Mummery was unveiled in the presence of the American Ambassador. The bust is a gift to the North-Western University, Chicago, from its London Alumni, and was formally received by Mr. A. D. Black, Professor of Dental Pathology in the North-Western University.

PAYING BEDS AT NEWCASTLE.—It is intended to provide a large number of beds for paying patients at the Royal Victoria Infirmary, Newcastle-on-Tyne. For this purpose three pavilions of the adjoining orthopædic hospital, which was recently taken over from the Ministry of Pensions, will be utilised, and it is expected that they will afford room for between 80 and 100 beds. The suggested charges will vary from 9*s.* per day upwards. At the moment the waiting-list of the Infirmary numbers 2000 persons.

An Address

[ABRIDGED]

ON THE

DEBT OF MODERN SURGERY TO THE ANCILLARY SCIENCES.

Delivered at the Annual Meeting of the British Medical Association at Manchester on Tuesday, July 23rd

BY ARTHUR HENRY BURGESS, M.B., M.SC. VICT., F.R.C.S. ENG., D.L.,

PRESIDENT OF THE ASSOCIATION; PROFESSOR OF CLINICAL SURGERY, UNIVERSITY OF MANCHESTER; HONORARY SURGEON TO THE MANCHESTER ROYAL INFIRMARY.

[AFTER referring to the changes in the medical profession and in the hospital arrangements since the Association's visit to Manchester in 1902, and to the work of the 2nd Western General Hospital during the war, Prof. Burgess discussed the sharp dividing line between the history of surgery before and after the time of Lister. He explained how this extension had been particularly noticeable in the development of abdominal surgery. He gave a local illustration of this development by comparing the operations performed at the Manchester Royal Infirmary at the beginning and at the end of the first quarter of this century. During this period, the proportion of operations on the abdomen had risen from 11 per cent. to 57 per cent., the annual number of operations for acute abdominal conditions from 82 to 1241, while their total mortality had diminished from 36 to 8 per cent. Prof. Burgess continued :—]

This progress in surgery—which, I feel strongly, will compare favourably with that attained in any other branch of the arts and sciences—has not, nor could it have been, achieved without the material assistance of the contemporary advances in the allied sciences; it is, indeed, this which constitutes my main thesis to-night. Modern victories are rarely won single-handed, and the greater the number, the more effective the strength and the more vigorous the activities of the allied forces whence assistance is forthcoming, the more confidently may we look forward to a victorious issue. Prior to the time of John Hunter surgery was almost entirely an art—a glorified handicraft, taught and practised quite independently of all other arts and sciences, devoid of any physiological basis for its methods, and essentially empirical in its attempts at progress. Hunter, deeply imbued with the scientific spirit, introduced into surgery the method of careful observation, collection, and collation of facts, and their thorough testing by direct experimental investigation, rather than that of trusting to theories founded on insufficient and unproved evidence. "Don't think—try" was his favourite exhortation. He it was who first gave allies to surgery, urging that surgery should be regarded as a branch of natural science, to be studied in its appropriate relationship to all the other branches, thus bringing it into close association with chemistry, physics, biology, comparative anatomy, physiology, and pathology. Had the microscope been available in Hunter's day he would doubtless have added to these bacteriology.

Every important discovery in the natural sciences since Hunter's time has exerted its influence upon contemporary surgical thought and practice, and overwhelming indeed would be surgery's debt to its allies were it not offset by a corresponding counter-debt for the help rendered to them in return by the great advances that have been made in surgical knowledge.

Though the choice for consideration to-night of a few only of the numerous component factors of this debt of modern surgery to the ancillary sciences must necessarily prove an arbitrary and rather an invidious task, yet I feel that the concensus of surgical opinion will endorse my selection of physics and of physiology as the two sciences to which, in recent times, surgery is most indebted; and further, that of the many useful applications in surgery of the results of researches in physics three have established a special claim upon our attention—X rays, radium, and light therapy.

THREE APPLICATIONS OF PHYSICS.

1. *Radiology.*

The X rays, discovered by Wilhelm von Röntgen of Würzburg in 1895, were early applied to the diagnosis of pathological states in the human being, and thus was founded the science of radiology, whose subsequent brilliant achievements not only constitute one of the most important chapters of progress in medical affairs during the present century, but also open up vistas of still greater possibilities for the future.

The organs and tissues of the body vary in the degree of resistance they offer to the passage of the X rays, and it is upon the relative opacity of an organ to that of the tissues in its immediate vicinity that the possibility of demonstrating its shadow upon the radiographic plate or screen depends. The bones and teeth are very much more opaque than the soft structures, and cast the deepest shadows; the lungs are the most translucent, so that the heart placed betweem them is relatively opaque, and casts a very definite pulsating shadow. The kidneys are seen only to a very limited degree, since they are surrounded by tissues of approximately the same density as themselves; were they situated in the thorax their visibility would equal that of the heart.

Foreign bodies are displayable in proportion to their density, those of a metallic nature taking the first place. Had we not had available during the Great War the assistance of the X rays in the detection and accurate localisation of the bullets, shell fragments, and other metallic particles lodged in the tissues of so many of our wounded, war surgery would have had a very much less successful tale to unfold. Calculi are opaque to the X rays proportionately to the amount of lime salts they contain, those of the urinary tract being nowadays displayed with such reliability that operations for the removal of renal and ureteric stones are practically never undertaken unless the presence of the calculus has been previously radiographically demonstrated. In the bladder, it is true, stones are occasionally met with composed of uric acid only and quite translucent ("radiolucent") to the X rays; such may easily be overlooked even if of large size, but fortunately we have, in the cystoscope, a certain means of their recognition. Calculi in the salivary and other glands are readily displayed, while, with improving technique, gall-stones are being shown in a steadily increasing proportion of cases.

The assistance of the X rays in the diagnosis and treatment of fractures and dislocations has proved invaluable, and the advice given recently by the council of the Medical Defence Union in a circular letter to its members, to insist upon radiography in every case of suspected fracture, would appear to be extremely sound from several points of view other than the intended one of defence against a possible legal action for malpraxis. Radiography soon taught us that in a large proportion of what were formerly considered to be merely "sprains" of joints some definite bony injury was present, the overlooking and consequent failure to apply appropriate treatment to which explains the popular idea that a "sprain is worse than a break." Many incomplete and impacted fractures, and some of those without displacement, cannot be detected by any other means than radiography, and of this the general public is becoming aware. The public is, however, much too prone to estimate the success or failure of treatment of a fractured bone by the extent of the anatomical deformity displayed in the

radiogram, rather than by the functional result; to the popular mind the "setting" of a fractured bone seems to imply that the radiographic picture should show the perfect apposition of the broken surface—an ideal which, though frequently most eloquently stressed by counsel for the plaintiff in an action for malpraxis, is, as the medical profession knows only too well, rarely attainable apart from open surgical operation.

X ray apparatus is now so efficient that the finest details of structure of the bones are easily shown, and the slightest changes therein induced by early disease can be readily detected. Thus the earliest manifestations of tubercle, of rickets, of syphilis, and of new growths as they affect bone are readily recognisable, and such knowledge conduces to earlier and more effective treatment. One of the commonest applications of radiography of the present day is that to the sockets of the teeth, and many a local source of origin of "local sepsis," otherwise inexplicable, has been thereby disclosed.

At an early stage of radiography its utility was vastly extended by the introduction of substances opaque to the X rays into parts of the body otherwise radiolucent, thus rendering them visible. The ramifications of sinuses in the soft parts were demonstrated radiographically by previously injecting them with bismuth paste. The introduction of the bismuth, and, later, of the barium meal has been *the* outstanding advance in radiology, and has completely changed many of our former ideas regarding the anatomical position, the form, and the physiological movements of the different parts of the alimentary tract, while it has added in a truly marvellous degree to our knowledge of their pathology. Radiology, to the infinitely greater safety of the patient, has entirely displaced the bougie in the diagnosis of œsophageal obstruction, and yields an accuracy of information as to the exact situation, extent, and nature of the cause of the obstruction previously quite unattainable. It thus differentiates readily between simple cicatricial stricture, malignant stricture, compression of the œsophagus by tumours from without, and the very imperfectly understood muscular obstruction at its lower end, to which the term "cardiospasm" is applied. The presence, situation, size, and shape of pharyngeal and œsophageal diverticula are demonstrated with certainty by means of the opaque meal, which has also taught us that diverticula of the alimentary canal, though most frequently met with in the pelvic colon, may occur also in the rest of the large intestine, in the appendix, the small intestine, the duodenum, and even in the stomach. The recognition of gastric and duodenal ulcers, of their complications, such as hour-glass contraction and pyloric stenosis; of gastric cancer, more particularly in its earlier stages; of obstructions of the intestines, especially that of carcinoma of the colon, by means of the opaque enema, either alone or in combination with the opaque meal; of displacements of the viscera such as are observed in diaphragmatic hernia or in visceroptosis, and the demonstration by Graham's method of the outline of the gall-bladder some 10 to 12 hours after the administration of tetraiodo-phenolphthalein, owing to the power of this viscus to concentrate the bile, in which the drug is excreted, to such a degree as to prove opaque to the X rays—all these constitute veritable triumphs of radiology, and have enormously facilitated the diagnosis of abdominal conditions.

Much the same may be said of the application of the opaque ureteral bougie and of the introduction of opaque media into some part of the genito-urinary tract during radiography—pyelography, ureterography, cystography, or urethrography, according to the portion of the tract concerned. Of these, pyelography has been most employed, and has disclosed alterations in the size, shape, and position of the renal pelvis, calyces, and ureters which have proved of the highest possible value in the diagnosis of renal pathological states.

The introduction into the trachea of the opaque medium lipiodol—a combination of 40 per cent. iodine with oil of poppy seeds—renders the bronchi and their ramifications visible upon a radiogram taken very shortly afterwards, and has been found useful in determining the relation of a foreign body in the lung to the nearest accessible bronchus, in demonstrating the outlines of lung abscesses, the presence and extent of bronchiectasis, the existence of a broncho-pleural fistula, and the extent of malignant growths involving the bronchi. Lipiodol was originally recommended by Sicard of Paris in 1921 for the localisation of the site of blockage of the subarachnoid space by spinal cord tumours. Introduced into the upper part of this space, as by injection into the cisterna magna, the medium falls by gravity to the level of the upper limit of the obstruction, and can there be radiographically shown. By injecting into the lumbar sac an "ascending" mixture of lipiodol and olive oil, of lighter specific gravity than the cerebro-spinal fluid, the lower extent of the subarachnoid block can be defined. The method is not altogether devoid of danger, and lipiodol once introduced, appears to remain unabsorbed for a long period, even for years. The injection of lipiodol into the uterine cavity has been used to indicate its size and shape, and any encroachment upon it as by a growth, while the failure of the medium to pass along one or both Fallopian tubes has been utilised in the diagnosis of their obstruction in cases of sterility.

Another method of altering the relative densities to X rays of adjacent soft structures, and thus rendering their outlines visible, is the introduction of a gaseous medium—air, oxygen, or carbon dioxide—as into the perirenal tissues, thereby allowing the outline of the renal shadow to be readily discerned; or into the peritoneal cavity, when the liver, spleen, and kidneys are rendered visible. The withdrawal by puncture through a drill hole in the skull of a small amount of fluid from one of the lateral ventricles of the brain and its replacement by air or oxygen has allowed the outlines of the ventricles to be rendered visible upon the radiographic plate; their increased size in internal hydrocephalus can thus be readily demonstrated, whilst the position relative to the ventricle of an otherwise obscure cerebral tumour can often be accurately ascertained.

The growing importance of radiology is evidenced by the steadily increasing proportion of patients who pass through the X ray department of our hospitals either for diagnosis or treatment. At the Manchester Royal Infirmary this proportion has gradually risen from 1 in 100 in 1908, to 1 in 24 in 1912, 1 in 11 in 1917, and 1 in 5 in 1928.

2. *Radium*

Radium was discovered in 1898 by Prof. and Madame Curie in a deposit of pitchblende from Joachimstal in Bohemia, and was at first a monopoly of the Austrian Government. This monopoly was transferred to the American Government in 1913 owing to the discovery in Colorado and Utah of carnotite—a mineral which, although the proportion of radium it contained was as small as 1 gramme in 400 tons, nevertheless proved profitable to work owing to the ease with which the radium could be extracted. The finding of some very rich lodes of pitchblende in the Belgian Congo in 1921 has now placed the monopoly in the hands of a Belgian syndicate, who, in their factory at Oolen, at present supply most of the world's demand. It requires from 30 to 40 tons of ore to yield 1 gramme of radium, and its extraction necessitates spacious premises, much labour, and many highly skilled operatives, all these factors being reflected in the present market price of about £12,000 per gramme. This monopoly seems likely to persist for some time, and only the discovery of a new source of really rich deposit can ameliorate the present situation.

Radium emits rays of three varieties—alpha, beta, and gamma—the last, similar to the Rontgen rays, and of high penetrative power, being those mainly used in deep treatment. Upon both animal and vegetable life radium has a decidedly detrimental effect, which is not, however, exercised equally upon all tissue cells, and even upon normal tissues radium has a decidedly selective action. Thus the cells of

glandular structures, especially those of the ovary and testis, are much more susceptible than those of fibrous tissue, while muscle, cartilage, and nerve-cells are the least sensitive. Actively dividing cells are the most vulnerable, and the cells of malignant growths, in which activity of cell division is a prominent feature, are more readily affected by radium than the other cells of the body. Upon this selective action the therapeutic value of radium in cancer depends, and our problem is to determine the exact dose that will exert the maximal destructive effect upon the cells of the malignant growth with the minimal upon those of the other tissues. There is a minimal dose below which no destructive action occurs, and many believe that these weak irradiations can stimulate the growth of tumour cells, and even stir into activity cells actually quiescent. The total dosage of radium, calculated in milligramme hours, can be applied either as a large amount of radium acting for a short time, or a small amount acting for a long time, and opinion is not yet decided upon the optimal dosage for each type of growth. On the one hand, by prolonging the duration of exposure, a greater number of cells will be adversely influenced during the vulnerable stage of active cell division; on the other hand, it has been shown experimentally that repeated sublethal doses may actually increase the resistance of the tumour cell to radium, and radiation treatment should, therefore, be concluded within a reasonably short time, and not indefinitely repeated.

As a therapeutic agent radium has been found of considerable value in non-malignant conditions—such as nævus, keloid, lupus and other skin diseases, exophthalmic goitre, and benign tumours—but it is in the treatment of malignant disease (including rodent ulcer) that its chief interest to us lies. Restricted at first entirely to cases too advanced for radical operative treatment, its scope has within the last few years been extended, either alone or in combination with surgery, to the treatment of operable cases. There has arisen a special branch of surgical technique —"the surgery of access"—concerned with the planning of operative procedures for the appropriate exposure of deeply seated malignant growths in order that radium tubes may be placed in correct relation thereto—as when a rectal carcinoma is exposed by removal of the coccyx and lower portion of the sacrum, an œsophageal carcinoma through the posterior mediastinum after rib resection or across the pleural cavity by lateral thoracotomy, or an intralaryngeal growth through a "window" cut in the thyroid cartilage. Modern methods of radium application have met with such considerable success in cancers of the skin, of the cervix uteri, of the mouth and tongue, and of the larynx, that there is an increasing tendency in these cases to prefer radium to operative treatment, at any rate so far as the primary growth is concerned. The comparatively slight disturbance of radium tube insertion, or of radium bomb treatment, their lesser risks, and the absence of that mutilation necessarily associated with a radical surgical operation, and which, as in the case of the tongue, may prove a considerable and permanent disadvantage, are factors favourable to radium, and should tend to overcome the natural reluctance of the average patient to submit to early treatment. It is, however, upon the end-results that the question must be ultimately decided, and these are not yet sufficiently known in the case of radium for a conclusive judgment, although some promising series of five-year statistics have been reported. In many cases the best results are obtained by a combination of radium treatment with surgery, as when the radical operation for cancer of the breast is associated with the implantation of radium tubes or needles into the supraclavicular and anterior mediastinal regions. At the present moment expert opinion seems to favour reversion to the external application of radium, either alone or in combination with radium tube insertion and very short wave-length X ray irradiation. There are, however, two most important changes from the surface applications as originally practised: (1) the much larger quantities of radium used—up to 4 g., and (2) the much greater distance from the skin—as much as 16 cm.—at which it is applied, thereby ensuring a more uniform dosage to all parts of the area irradiated, with lessening risk of cutaneous damage. This "bomb" or "cannon" treatment—as at present carried out in Paris, Brussels, Stockholm, and on a smaller scale at the Westminster Hospital, London—is considered by many likely to prove the method of choice in radium therapy, and it certainly deserves to be tested very thoroughly, should a sufficiency of radium be forthcoming. The still very high cost of radium in spite of the removal of the one-third *ad valorem* Government duty, and its restricted supply, are matters requiring urgent attention, and every means must be taken not only to increase its production, but also to ensure that the most efficient and most economical use is made of such supply as is already available, having regard to the absolute necessity, in this connexion, of maintaining an intimate association between treatment and research. The technique of radium therapy is highly specialised, and such work should be centralised and restricted to the expert staffs of special institutions established in a few of the largest cities of a country. Until the supply of radium becomes less inadequate to cope with the increasing demand it may be advisable to arrange for a "night" as well as a "day" staff of workers at these institutions in order to minimise the number of hours ("radium-hours") during which any of the radium is unemployed in treatment.

3. *Actinotherapy.*

Heliotherapy—treatment by sunlight—is probably as old as human history. Hippocrates (460 to 370 B.C.), refers to the effect of sunlight in promoting health, and recommends sufferers from various ailments to walk about naked in the sun as much as possible—a simple remedy, which seems, however, to have been overlooked for many subsequent centuries. At the end of the last century a considerable proportion of the beds in the hospital wards of our large cities was occupied with cases of tuberculous disease of the bones, joints, and spine, and other forms of "surgical" tuberculosis, for which operations, often of a very extensive and mutilating nature, and frequently requiring repetition, were considered the only chance of a cure. How frequently they failed, and, even when successful in saving life, the unsightly deformities and fearful defects of function that resulted are some of the unpleasant memories of those of us who practised at that time. No more beneficent change has occurred in any department of treatment than in that of surgical tuberculosis during the past quarter of a century.

Thanks to the pioneer work of Bernhard and Rollier in Switzerland, and of Sir Henry Gauvain and Sir Robert Jones in this country, these mutilating surgical operations are things of the past. Surgical tuberculosis is nowadays treated by a general exposure of the body to sunlight in the open air in summer, and to artificial sunlight in the winter or whenever natural sunlight is not available. This should be combined with local treatment so designed as to ensure complete immobilisation of any active focus, the removal of any pressure or weight-bearing, the correction, so far as is possible, of any existing deformity, and the antiseptic care of any discharging sinuses. Active surgery is limited almost entirely to the evacuation of any cold abscesses that may develop, although in tuberculous spinal disease operations (Albee's, Hibbs's) are occasionally performed, not as a direct attack upon the affected tissues, but to ensure better immobilisation of the morbid focus in the vertebral bodies by producing ankylosis of the spinous processes of the diseased vertebræ and of those immediately above and below. Under this modern plan of campaign not only is victory assured in a much greater proportion of cases, but the bronzed and robust-looking bodies of the patients under sunlight treatment contrast pleasurably with the waxen faces and wasted limbs of the old

days, while the local focus of disease heals with the minimum of deformity and the maximum preservation of function.

Treatment by ultra-violet radiation (actinotherapy) is now being extended to rickets and other general diseases, to most forms of skin disease, and to many disorders of the circulatory, respiratory, alimentary, nervous, and genito-urinary systems, as well as to those of the special senses. It has, in fact, assumed the dimensions of a "boom" treatment, and "sun-ray" centres are being established all over the country, not only as private ventures, often controlled by laymen only, but also at the municipal bathing establishments of many of our cities and towns, while there are sunbaths in many factories and at "pitheads" in several of our coal-mining districts.

The ultra-violet rays are, however, far from being innocuous, and their correct dosage is a matter of great importance and of careful individualisation, since what is a safe dose for one may be dangerous to another. Over-exposure to their influence produces sleeplessness, restlessness, loss of weight, lassitude, and even sickness, while severe burns and serious forms of dermatitis may result in sensitive persons. Moreover, some ailments are adversely influenced by ultra-violet ray treatment—notably chronic nephritis, arteriosclerosis, and quiescent tuberculosis, the last of which may easily be stirred into renewed activity. It is therefore in the public interest that the prescription of ultra-violet rays be restricted to the medical profession, and that their application be undertaken only by those who have received a proper course of training for this special work.

In view of the risks to the public involved in the use of electricity and radiation as methods of treatment by untrained and unqualified persons, the Representative Body of the British Medical Association, at the last annual meeting, expressed the opinion that suitable courses of training should be organised under medical direction for persons wishing to administer this form of treatment; that persons who have satisfactorily followed such a course should be entitled to have their names entered on an approved roll; that they should undertake to treat only patients sent to them by medical men, and that medical men should refer their patients only to those persons whose names are on the approved roll. Along these lines the Society of Apothecaries of London, acting in concert with the British Medical Association, has recently agreed to set up a standard to which persons practising physiotherapeutic treatment should attain, to institute a diploma, and to establish a register of those found qualified to serve as "biophysical assistants," such registration to entitle the appendage of the letters "B.P.A." to their names. The unqualified, unregistered chemist, dentist, and midwife are forbidden by law, and it seems only logical that the unqualified electrotherapist, who handles therapeutic measures equally potential of danger, should be placed under similar legal control.

Physiology: The Essential Foundation of Modern Medicine and Surgery.

Physiology has often been referred to in the past as the handmaiden of medicine, but such a description very inadequately represents its present status as a proud and independent branch of true science—the science of life itself. Rather must it be described as the essential foundation of modern medicine and surgery, as the means by which many of our former purely empirical methods of treatment have been placed upon a rational basis, and as the main factor by which the practice of medicine and surgery is daily becoming proportionately more of a science and less of an art. That the element of art must continue permanently to play a considerable part in surgery is self-evident when we remember how largely handicraft enters into its daily routine, but the merely artistic aspect of surgery has now, we may fairly claim, been brought to so high a degree of perfection that it is not so much upon outstanding advancements in surgical artistry that we must rely for future progress as upon a more thorough understanding of the physiological principles involved in our work, and their application to what is, after all, the great aim of surgery—the restoration of deranged function to the normal. The greater comprehension the surgeon obtains of what constitutes normal function the better equipped is he to achieve this aim, and to improve his methods by means which were not possible in the days when physiology was less advanced. The surgeon and the physiologist must tread the path of progress hand in hand, to the great advantage of each, since the debt between them is essentially a mutual one. For the success of his experiments upon animals the physiologist has to depend largely upon the methods of modern aseptic surgery, and has, therefore, a very vital interest in any improvements in surgical technique that may from time to time accrue. Moreover, though it is true that many discoveries made by physiologists which have found valuable practical application in medicine and surgery have originated purely in the search after truth and without any thought of their possible clinical utility, yet, on the other hand, there are many instances where clinical observation has been the starting point of physiological researches which have ultimately proved of the greatest benefit in the treatment of human disease. One of the most impressive illustrations of this is yielded by the development of our knowledge of the localisation of function in the cortex of the brain.

[Prof. Burgess gave a historical survey of the progress made in the localisation of cerebral function, and in our knowledge of the functions of the thyroid gland.]

New Methods of Study.

The progress of physiology during the present century has been characterised by many new methods of study, by the greater attention devoted to human physiology, and by the enormous strides made in the physiology of nutrition. If we look back to the beginning of this century and compare the state of physiological knowledge then with that of the present day it is wonderful to contemplate the discoveries that have been made. The use of X rays for the examination of the function of the stomach and small intestines, developed first of all by Cannon for physiological purposes, had only just begun to be applied to the diagnosis of alimentary diseases. The rôle of proteins in nutrition was imperfectly understood and their chemical constitution was only a conjecture. Vitamins had not been heard of. Insulin was still a hypothetical substance. None of the active principles of the ductless glands had been synthesised and their mode of action was very incompletely known. Micro-methods for the biochemical examination of the blood and other body fluids were practically unknown. The buffering mechanisms of the blood were not dreamt of, and the close interplay between normal physiological functions such as secretion and respiration, and their part in the regulation of body neutrality, was not known. The relation of the capillary circulation to the production of shock is also a relatively recent discovery.

All these advances in knowledge, and many others that might be mentioned, have had their influence on surgery—directly, because they have improved methods of diagnosis and treatment, and indirectly on account of their influence on the attitude of the surgeon to his subject. It is impossible to deal in detail with each particular advancement which surgery owes to physiology, but a few examples may be mentioned.

[Prof. Burgess then outlined the pioneer work of Gowland Hopkins on vitamins, and of E. Mellanby on dietetic deficiencies leading to rickets, and traced the effects in medicine of the discovery of vitamin D in certain foodstuffs, and of its production by irradiation of ergosterol. He spoke of blood transfusion as one of the most useful of our emergency surgical therapeutic measures, which had been reintroduced on a sound physiological basis, when its dangers had been eliminated by the differentiation of the four now well-known blood

groups. Another triumph of physiological research, which was useful to the surgeon as to the physician, was the isolation and standardisation of insulin. No patient was now refused any necessary operation because of diabetes, the mortality of operations upon diabetics had been reduced to that in cases without this complication, and it seemed likely that in the future, with a better knowledge of the part played by insulin in carbohydrate metabolism, it might find other surgical uses.

Prof. Burgess then discussed at greater length the physiology of the kidney as applied to surgical problems :—]

Assessment of Renal Function.

It is principally to the painstaking and persevering work of the American biochemist Folin that we owe the modern micro-methods of blood analysis whereby, using only a few cubic centimetres of blood, all the important constituents can be accurately determined. These methods have been particularly helpful in cases where prostatectomy is contemplated and where it is essential to know to what extent the excretory functions of the kidneys have been already adversely affected by back-pressure from the prostatic obstruction, as indicated by the abnormal retention in the blood of urea, uric acid, creatinin, and other waste products to an extent varying directly with the degree of renal derangement. It cannot, in fact, be too strongly stressed that the operative risks of prostatectomy are concerned infinitely more with the condition of the kidneys than of the prostate, and that by delaying the major operation until the renal functions have been improved by the relief from "back-pressure" afforded by adequate preliminary drainage of the bladder—either by the indwelling catheter or by suprapubic cystostomy—the dangers attending the removal of the prostate can be very materially diminished. Biochemists, by means of their tests of renal functional capacity, have enabled surgeons to estimate the power of the kidneys to withstand surgical intervention with a degree of accuracy that is truly remarkable. Would that the same could be said of the liver, and that we could "size-up" the functional state of that organ as simply and as correctly as we can that of the kidneys. So manifold and varied, however, are the functions of the liver, and so diverse the directions in which deranged hepatic function may become clinically manifest, that any reliable estimation thereof must necessarily involve more extensive and more complicated procedures than in the case of the kidneys.

Of other methods of applied physiology to which the surgeon is indebted, mention may be made of the use of fractional gastric analysis for investigation of the activity, both digestive and motor, of the stomach; the duodenal tube for the collection and examination of bile; estimation of the basal metabolism as a guide to over- and under-activity of the thyroid and pituitary glands, and to the nature of the operative procedures to be undertaken in connexion therewith; determination of the carbon dioxide combining power of the blood and its relation to the diagnosis of those conditions of acidosis and alkalosis that occasionally complicate surgical procedures; and the examination of the red blood corpuscles for "fragility" in cases of splenic enlargement, as in haemolytic jaundice.

In the past a large proportion of the discoveries of physiology has been the outcome of experiments upon animals, conducted in physiological laboratories, while the wide field for the investigation of its problems offered by the hospital wards and operating theatres has been comparatively little utilised. For the elucidation of many points man himself possesses many advantages over the lower animals as a subject of investigation, and a more active encouragement of clinical research in human physiology is one of the prominent needs of to-day. In Manchester the University professor of physiology has been placed along with his colleagues in anatomy, physics, and pharmacology, upon the consulting staff of the Royal Infirmary, so that the closest possible connexion is maintained between these ancillary sciences and the clinical aspects of medicine and surgery.

Application to the Human Machine.

Pregnant with promise, too, is the recent extension of physiological research to the whole field of human activity. Laboratory investigations have taught us much of the physical and chemical workings of the individual systems of the human body, and have supplied us with various measures by which these can be tested. But of the workings of the human machine as a whole under the varying conditions and stresses of industrial and other forms of activity comparatively little was known. Early in the war it was recognised that the methods of medical examination of recruits then in vogue were far from satisfactory, and their inefficiency was frequently shown up on the parade ground and in the training camps. Especially was this so in the case of individuals in the Royal Air Force, where it was soon recognised that perfectly "sound" men, in the usually accepted medical sense, might nevertheless be quite unfitted to control an aeroplane. New and more delicate tests were required of the functional activity of the various systems, especially the visual, circulatory, and nervous systems, and of their quickness of response to the constantly changing conditions met with in flying. The medical officers of the Royal Air Force have shown most praiseworthy ingenuity in devising methods for the more efficient testing of the body functions, and have given a great impetus to the study of the healthy human machine at work under conditions hitherto unknown. In the field of industry it is becoming more generally recognised that the test of health is the capacity to perform effective work, and researches are constantly being made into the effects of environmental factors—for example, fatigue, monotony, noise, high illumination—upon the productive efficiency of the industrial worker. It has been shown that the distribution of industrial accidents amongst workers exposed to similar conditions of risk is not a mere matter of chance, but that each has an individual proneness to accident which can be fairly exactly estimated by testing the rapidity and accuracy with which he reacts to certain visual, auditory, and tactile stimuli. Though much still remains to be accomplished, the valuable information thus acquired has already brought about vast improvements in working conditions in many of our industries, and in the standard of health and the productive capacity of those employed therein.

OTHER ANCILLARY SCIENCES.

Of modern surgery's debt to the other ancillary sciences that to bacteriology is assuredly the most fundamental, since it was Pasteur's discovery that fermentation and putrefaction were caused by minute living organisms and were, therefore, vital and not merely chemical processes, as hitherto believed, that led Lister to his great conception of the antiseptic treatment of that putrefaction then found in almost all wounds—a conception which constitutes, as we have seen, the very starting-point of modern surgery. Time permits me merely to mention other advances in bacteriology: the detection of the causative germs of almost all the infective diseases; the elucidation of the great principles of immunity, both "active" and "passive"; the preparation of vaccines and of antitoxic serums and their use in the prevention and treatment of bacterial infections; the therapy of systemic infections by the intravenous introduction of chemical antiseptics resulting, among other notable gains, in that brilliant conquest of the former scourge of syphilis that has been achieved within the present century—all of which constitute milestones along the highway of bacteriology's triumphal progress.

Nor have I time to refer to the great help that modern surgery has received from research workers in anatomy, pathology, and pharmacology, valuable as their contributions have been; nor yet to more general sources of assistance such as the greatly improved means of rapid intercommunication (the

telephone, the wireless) and of rapid transport (the motor-car, the aeroplane), factors which have so materially facilitated the prompt application of surgical relief in cases of emergency, whether on land or at sea.

I trust, however, that enough has been said to indicate that modern surgery, with the aid of its allies, has made, and is still making, great progress towards that end we all so fervently desire—the prevention of those abnormal conditions, the late results of which to-day necessitate so much surgical attention of a destructive rather than a constructive character. Much yet remains to be done, and the natural sciences must continue to advance, each ready to assist and to accept assistance from its fellows, each along its own special path yet all in mutual friendly alliance working for the common good, all in zealous pursuit of that goal, unattainable though it must ever remain, that will-o'-the-wisp of perfect knowledge and complete understanding. In so doing they will but follow the precept and the spirit of that motto upon the crest of our beloved University, in whose venerable precincts this great Association will to-morrow enter upon its full scientific programme, and of which we in this city are all so intensely proud; "Arduus ad solem"—"leaping upwards to the sunshine"—"ever striving towards the very highest."

ON THE

Clinical Classification

OF

CONGENITAL CARDIAC DISEASE.*

By MAUDE E. ABBOTT, M.D. McGILL.,

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CLINICIANS do not always recognise the fact that congenital cardiac disease does not necessarily mean "blue baby" or *morbus cæruleus*, with its familiar symptom-complex of cyanosis, dyspnœa, and clubbing, and its progressively downward course. This condition gives little scope for the physician's skill, since the deficient oxygenation of the blood thus revealed is the result of unalterable structural changes in the heart. On the other hand, there exists a larger and clinically a much more important group of congenital cardiac patients to whom the word "acyanotic" applies, for the reason that these patients do not, under otherwise normal conditions in the body, present any raised oxygen-unsaturation at all, so that they show either no cyanosis, or cyanosis only as a transient or very "late" phenomenon. In this group are included those congenital lesions in which *no abnormal communication* between the two circulations exists, so that venous blood does not enter the arterial stream as a result of the anomaly—e.g., coarctation of the aorta—and also the localised cardiovascular septal defects, in which, in the absence of complications and under the physiological conditions of relatively higher pressure in the systemic circulation, blood passes from left to right through the defect. In these cases an *arterial-venous shunt* exists, which may, in the event of a pathological rise of pressure in the right chambers, be temporarily converted into a venous-arterial shunt, with the appearance of *transient* or *terminal* cyanosis.

ACYANOTIC CASES.

These so-called "acyanotic" cases are of great importance to the clinician, for such patients have a relatively good expectation of life, and may live to an advanced age without showing any sign of being hampered by their anomaly. On the other hand, the defect is almost always the seat of strain, and this renders these subjects peculiarly liable to serious complications, especially infective endocarditis or endarteritis usually of the subacute bacterial form, which commonly involves the margins or neighbourhood of the defect, and usually has a lethal termination; or, in another set of cases, the wall of the aorta may undergo spontaneous rupture, either from a concomitant congenital thinning of its coats, or from increased intra-arterial tension; or the myocardium itself may fail, leading to cardiac insufficiency or to the conversion of an arterial venous into a venous-arterial shunt. The fact that these acyanotic congenital lesions do present a fairly good prognosis in the absence of the grave complications which threaten them, makes their early recognition and the rigid preventive care of such patients imperative. The American Heart Association classifies patients with healed rheumatic lesions as "potential cardiacs," and prescribes for these the removal of foci of infection, proper rest, and careful supervision with a view to the avoidance of undue strain, and the elimination of unnecessary risks. It is surely desirable that acyanotic congenital cardiacs should be similarly classified, and as carefully safeguarded and watched.

DIAGNOSIS.

A congenital cardiac lesion of the acyanotic group may usually be "picked up" by detecting, in an otherwise apparently normal individual, the presence of pulsation murmur or thrill of unusual localisation and character in the cardiovascular area. Incidentally, these people often display the slender habitus characteristic of the hypoplasia of the aorta often associated with this congenital lesion. With the help of X rays a further differential diagnosis can often be made between such classic conditions as coarctation of the aorta, subaortic stenosis, and the various forms of cardiovascular septal defects (patent ductus, maladie de Roger, and so forth). In infants under one year, however, practically no differentiation into "cyanotic" or "acyanotic" types can be made with certainty because, excepting the most complex cases of extreme morbus cæruleus, cyanosis often does not manifest itself until after many months of postnatal life. So that one must here be content as a rule with the mere recognition of the presence of a congenital lesion, until sufficient time has elapsed after birth for the manifestation of cyanosis after the "threshold-value" of raised oxygen-unsaturation is reached.

THE CYANOTIC GROUP.

A word may be added regarding the diagnosis of the cyanotic group, though this is of much less practical importance. Once infancy is past, these subjects are readily recognised by their very striking symptomatology, especially the cyanotic hue, which deepens on exercise; and when to these appearances are added atypical physical signs over the cardiac area the presence of a morbus cæruleus is readily established. Differentiation of the exact lesion present in such a cyanotic case can scarcely be determined with certainty, but only a few combinations survive into adult life (see classification below), and of these that most commonly met with in cyanotic patients reaching early adult life is the "tetralogy of Fallot" (pulmonary stenosis, with associated ventricular septal defect and dextroposition of the aorta). These conditions exist in at least 75 per cent. of cyanotic young adults with congenital lesions. In cyanotic patients living beyond middle life one may suspect complete defect of the interventricular septum (cor-triloculare biatriatrium) or pulmonary stenosis with closed interventricular septum, since statistics show that the average duration of life in these cases is relatively long.

CLINICAL CLASSIFICATION.

Under the classification set out below, which I have elaborated in the section on Congenital Cardiac Disease in the third edition of Osler and Macrae's

* Abridged from an address delivered at the New Sussex Hospital, Brighton, on July 20th, 1929.

"Modern Medicine" (London, 1927), the principal cardiac anomalies are grouped in the order of their clinical importance.

A. Of Clinical Significance.

I. *Non-cyanotic Group.*

1. Cases in which no abnormal communication exists, but in which the defect may produce a *mechanical interference* with the circulation which become the seat of strain. These are: pericardial defect; ectopia cordis abdominalis; primary congenital hypertrophy; congenital heart-block; anomalous septa; pulmonary and tricuspid insufficiency; aortic and mitral stenosis; anomalies of semilunar and auriculo-ventricular cusps; coarctation and hypoplasia of the aorta; anomalies of the aortic arch; anomalies of coronary arteries; congenital arteriovenous aneurysm; certain anomalies of veins and anomalies of pulmonary artery.

2. Cases of *arterial-venous shunt* with possible terminal or transient reversal of flow (*cyanose tardive*): (*a*) Defects of the interauricular septum (persistent ostium primum; persistent ostium secundum; patent foramen ovale; multiple defects; complete defect (cor-biventriculare triloculare). (*b*) Localised defects at the base of the interventricular septum (*Maladie de Roger;* defects below; multiple). (*c*) Patent ductus arteriosus and localised defects of aortic septum (communication just above the aortic valve; congenital aneurysm of the right aortic sinus of Valsalva).

II. *Cyanotic Group.* (*Morbus cæruleus.*)

1. Cases of *venous-arterial shunt* (arranged in order of severity of shunt). (*a*) *Moderate cyanosis:* Dextroposition of aorta with defect at base of ventricular septum; complete absence of ventricular septum (cor biatriatrium triloculare); pulmonary stenosis of inflammatory type with closed ventricular septum and patent foramen ovale; tricuspid atresia with interauricular septal defect and transposition of the great trunks. (*b*) *Marked cyanosis:* Pulmonary stenosis with dextroposition of aorta and interventricular septal defect (tetralogy of Fallot); pulmonary atresia with ventricular septal defect, dextroposition of the aorta, and patent ductus; transposition of arterial trunks with ventricular septal defects and dextroposition of the aorta. (*c*) *Extreme cyanosis:* Complete absence of cardiac septa (cor biloculare); complete defect of aortic septum (persistent truncus); transposition of arterial trunks with patent foramen ovale and patent ductus but closed interventricular septum: pulmonary atresia with closed ventricular septum, patent foramen ovale and patent ductus; aortic and mitral atresia with defect of interventricular septum and aplasia of aorta.

2. *Cases of Raised Peripheral Pressure. Right-sided valvular lesions* with closed septa (pulmonary and tricuspid stenosis).

B. Cases of No Clinical Significance.

Diverticulum of pericardium; bifid apex of heart; diverticulum of heart; acardia, ectopia cordis pectoralis (non-viable); congenital rhabdomyoma; true (mirror-picture) dextrocardia.

[Dr. Abbott demonstrated with an epidiascope diagrams illustrating the course of the circulation in the different defects, and photographs of the corresponding pathological specimens.]

THE BACTERIOLOGICAL DIAGNOSIS OF WHOOPING-COUGH.

By H. SUGARE, M.D. Leeds,
AND
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Since the original work of Bordet and Gengou (1906), in which they demonstrated the existence of a bacillus morphologically similar to, but distinct from the influenza bacillus, in the sputum of patients suffering from whooping-cough, there has been very little attempt, except in Denmark, to make a practical application of these findings. The medical profession has not resorted to the bacteriological diagnosis of doubtful whooping-cough. The reasons for this may be that a certain scepticism still prevails about the ætiological connexion of the bacillus which these observers described with this disease and that it has not been realised that the differentiation of this bacillus from the influenza bacillus is easily made.

Observations such as those of Wollstein (1909) and Scheller (1912), who found difficulty in repeating Bordet's serological observations in the disease, have probably contributed to this scepticism, and many of the statements in the text-books and elsewhere leave the impression that the differentiation between *B. influenzæ* and *B. pertussis* rests on some relatively fine points—e.g., Andrewes (1920), in discussing the influenza group of bacteria, says, "Many bacteriologists would agree that we may be confounding under the common term, *B. influenzæ*, a number of closely related species. Bordet's 'whooping-cough bacillus' would fall into such a group."

It is one of the purposes of this paper to emphasise afresh the facts already indicated by Bordet and more recently stressed by Kristensen (1922) that although these bacilli are probably related species there is little ground beyond that of microscopic morphology for confusing them. In the examination of the thick whitish exudate expectorated in the early stages of the disease, Bordet and Gengou demonstrated the presence of a small Gram-negative ovoid microbe, constant in size and appearance (1906). The medium used for successful cultivation was blood-agar with a basis of glycerinated extract of potato (1907). Even on this special medium their organism grew remarkably slowly, two–three days elapsing before the colonies appeared. In the examination of specimens of sputum from patients who had been affected with whooping-cough for some time, Bordet and Gengou found in almost every case and apart from the *B. pertussis*, an organism identical with or very similar to the bacillus found by Pfeiffer in cases of influenza. It was, however, smaller than *B. pertussis* and it showed a marked tendency to pleomorphism and to the development of involution forms. Bordet and Gengou also showed that this organism was met quite frequently in other respiratory affections besides whooping-cough. In a series of papers published subsequently Bordet elaborated and confirmed his original observations with Gengou on the morphological and cultural characters of the *B. pertussis* found by them in early cases of whooping-cough (1907, 1908, 1909 and 1912).

Kristensen (1922) has drawn attention to two additional points of contrast between these bacilli: (1) the capacity of *B. pertussis* to survive for considerable periods on suitable media at low temperature, a character lacking in *B. influenzæ* in his observations, and (2), more important still, the inability of *B. pertussis* to grow freely on the media best adapted for the growth of *B. influenzæ*, such as Levinthal's, "chocolate agar," &c. Convinced by these and other points of the ease with which *B. pertussis* can be differentiated from *B. influenzæ*, the staff of the Danish State Serum Institute has been carrying on the bacteriological diagnosis of whooping-cough for several years for the benefit of general practitioners and others.

So far as we are aware no attempt has been made to corroborate or reject Bordet and Gengou's findings in this country. At all events, we have been unable to find any record of it. It is not clear from the published records whether Freeman's work relates entirely to observations made with cultures obtained from Bordet or refers also to strains isolated by himself (1909). In view of this state of affairs it seemed desirable to find how far the results obtained in Belgium and Denmark could be corroborated in this country; and in case they should be, to control the observations by determining the frequency with which this bacillus could be detected in the trachea and bronchi of children dying from various causes other than whooping-cough. The last type of observations does not appear to have been made

and has obviously an important bearing on the significance of the detection of the organism in cases of the disease.

Technique of Culture.

The medium of culture used for the isolation of the organism was the one in use at Copenhagen slightly modified.

500 g. of sliced potato were boiled down in one litre of water with 40 c.cm. glycerine. The mass was filtered through a sieve, then through lint. To one part of the liquid thus obtained, three parts 0·6 per cent. sodium chloride solution were added. The mixture was rendered slightly alkaline (pH 7·5), 4 per cent. agar was then added, and the whole was then sterilised in the autoclave and tubed off in 7 c.cm. portions.

In preparing plates the tubes containing the potato-glycerine-agar extract were liquefied and allowed to stand in a water-bath at a temperature of 50° C., 3–5 c.cm. of sterile defibrinated rabbits' blood previously warmed in a water-bath to a temperature of 40° C. were then added to each, and the mixture poured into a sterile Petri dish and allowed to cool. Before pouring, the tube containing the blood and agar mixture was gently rotated by hand to bring about a thorough admixture of the contents, with the result that the plates appeared smooth, uniform, and of a bright red colour.

Method of Obtaining Sputum.—A sterile Petri dish in a suitable box was left overnight at the house of the patient and kept in a cold place till ready for use. The specimen of sputum was obtained early in the morning, so as to prevent any possible mixture of sputum with vomited food material. At the end of a paroxysm of coughing the child expectorated into the dish, which was again returned to the cold place until called for. Great emphasis was made on obtaining, if possible, thick, tenacious sputum expelled at the end of a paroxysm of coughing. On the average there was a period of two hours between the collecting of sputum at the house of the patient and its removal to the laboratory and inoculation on Bordet-Gengou medium.

Method of Making Cultures.—A portion of the thickest part of the expectoration was emulsified in 2–3 c.cm. sterile saline, and a very light inoculation of this was made by means of a platinum loop on to the Bordet-Gengou medium and spread over the whole surface by a slender glass rod, the terminal portion of which was bent at a right angle. Another portion of sputum was spread over the surface of a second plate without the preliminary dilution in saline. These two plates were then incubated at 37° C. and examined at the end of 24, 48, and 72 hours.

Bacteriological Findings.

After 72 hours' incubation small, raised, pearl-like colonies made their appearance. These colonies were so characteristic that it was possible when they were numerous to conclude from examination of the plate with a lens alone whether the Bordet-Gengou bacillus was present or not. Microscopic examination of these colonies showed small, ovoid, Gram-negative bacilli uniform in size and subcultures made on "chocolate agar" and Bordet's medium respectively fully confirmed Kristensen's observations. The *B. pertussis* when recently isolated gave little or no growth on "chocolate agar"—a medium particularly well adapted to the growth of *B. influenzæ*.

Kristensen's other differential point between the two organisms was not so clearly confirmed, for although it was found that *B. pertussis* after a preliminary incubation of three days remained alive at least four or five weeks in the ice-chest at 4° C., the behaviour of *B. influenzæ* strains was variable. Some certainly died much more rapidly; but three strains isolated during the 1929 Leeds epidemic were peculiarly resistant, although they did not survive as long as the *B. pertussis*.

A further differential point which has been observed independently in Japan is that the *B. pertussis* is one of the bacteria which give an exceptionally active catalase effect, whereas *B. influenzæ* gives a weak catalase effect.

The Japanese worker, Nishibe (1926), maintains that *B. pertussis* is further distinguished from *B. influenzæ* by giving an oxidase reaction with a dimethyl *p*-phenylene diamine and α-naphthol reagent. Ellingworth, McLeod and Gordon (1929), however, using tetramethyl *p*-phenylene diamine, which is more sensitive to oxidation than the dimethyl compound, observed that both *B. pertussis* and *B. influenzæ* oxidised this compound, although the former was more vigorous in its action.

All these facts go to prove that the bacillus of Bordet and Gengou must be recognised as a well-defined bacterial species distinct from the *B. influenzæ*.

Description of Cases.

The sputum from 17 patients suffering from whooping-cough was investigated and the Bordet-Gengou bacillus was successfully isolated in ten cases (see Table). With one exception, J. D., they were obtained from private medical practice. With the exception of patient H. P., the sputum was obtained in the post-catarrhal stage of the disease. In general medical practice it is very difficult to obtain early cases because treatment is usually sought when the characteristic paroxyms are already present. In Denmark, however, as the result of the establishment of a diagnostic station connected with the State Serum Institute at Copenhagen, the culture medium is sent out in aluminium Petri dishes on the demand of medical practitioners. In this way it is possible to examine a large number of specimens of sputum from patients affected with whooping-cough in all stages of the disease and also from suspected cases.

Table giving Summary of Results.

Patient	Sex and age.	Stage of whooping-cough.	Isolation of bacillus.	Patient.	Sex and age.	Stage of whooping-cough.	Isolation of bacillus.
B. D.	F. 4 y.	2nd wk.	P.	D.M.D.	F. 7 m.	Catarrhal	P.
C. F.	F. 4½ y.	2nd ,,	A.	J. C.	M. 1½ y.	2nd wk.	P.
I. R.	F. 3½ y.	3rd ,,	A.	C. B.	M. 2 y.	3rd ,,	A.
D. A.	F. 4 y.	3rd. ,,	P.	H. P.	M. 5 m.	1st. ,,	P.
A. P.	F. 4 y.	2nd ,,	P.	J. D.	M. 4 y.	1st ,,	P.
F. S.	F. 4 y.	2nd ,,	A.	E. C.	F. 9 m.	2nd ,,	P.
T. W.	F. 3 y.	5th ,,	A.	A. C.	F. 5 m.	2nd ,,	P.
F. T.	M. 5 m.	Contact	A.	L. D.	M. 4 y.	3rd ,,	A.
I. W.	F. 7 m.	1st ,,	P.				

y. = years; m. = months. P. = present. A. = absent.

A second small series of cases examined two years later gave the following results:—

Two cases examined in the week in which the whoop developed—both positive.

Two cases examined in the third week of the disease—both negative.

Two suspected cases which had not developed a whoop—one negative and one positive.

Post-mortem Observations.

Fifty children under 10 years of age dying from various causes were examined post mortem to determine the incidence, if any, of the Bordet-Gengou bacillus in the upper respiratory tract.

A similar technique was adopted throughout. The larynx, trachea, and lungs were removed intact. Surface sterilisation of each part was effected by means of a heated spatula. A sterile pipette was introduced below the surface and then the point pushed out laterally beyond the heated area; the material thus obtained was inoculated on to a "chocolate agar" plate and a plate of Bordet-Gengou medium, one plate of each medium being used for each part of the respiratory tract examined. The "chocolate agar" plates were examined at the end of 24–48 hours' incubation at 37° C. and the Bordet-Gengou plates at the end of 72 hours' incubation at 37° C. Any colonies of Gram-negative bacilli appearing on the "chocolate agar" plates were subcultured on to "chocolate agar" and ordinary agar and incubated for a further 24 hours. Gram-negative bacilli which grew freely on "chocolate" and failed to grown on ordinary agar were accepted as *B. influenzæ*. The result of these post-mortem investigations brought out the following facts: Percentage incidence of *B. pertussis* was nil, and that of *B. influenzæ* was 26 per cent.

Discussion.

These observations very definitely support the contention of Bordet and Gengou that the bacillus which they described is the cause of whooping-cough. The practical question whether the institution of a bacteriological diagnosis of whooping-cough would be of real value to the community should, in our opinion, be answered in the affirmative. For it seems to us that good use could be made of bacteriological diagnosis in the case of patients clinically doubtful, who might be a serious source of contagion—e.g., school-children. The slowness with which the colonies develop and therefore with which the results are available is a drawback, but it is possible that a method of overcoming this will be found.

Summary and Conclusions.

(1) The Bordet-Gengou bacillus was successfully isolated in 12 out of 21 cases of whooping-cough and in all of five cases examined within the first week of the disease.

(2) The organism required for its successful growth a Bordet-Gengou medium freshly prepared and on this medium after three days' incubation gave a highly characteristic small pearl-like colony. Microscopic examination of such colonies showed small, ovoid Gram-negative bacilli, uniform in size.

(3) The bacillus of Bordet and Gengou and *B. influenzæ* are two quite distinct bacterial species. The characters which distinguish them are the following:—

(1) *B. influenzæ* grows quickly, *B. pertussis* grows slowly.

(2) The appearances of the colonies on Bordet-Gengou medium are quite distinct; those of the *B. pertussis* being unlike those of any other bacterium that is commonly found in the sputum, and therefore the bacteriological diagnosis can frequently be made by inspection of the plates alone.

(3) *B. pertussis* can be preserved without subculture for periods of four to five weeks at least at temperatures of 10°–0° C.; whereas many strains of *B. influenzæ* are not easily kept without subculture for more than a fortnight under any conditions.

(4) The media most suitable for growth of *B. influenzæ*—heated blood agar, &c.—are quite unsuitable for the growth of recently isolated strains of *B. pertussis*.

(5) *B. pertussis* gives a very active catalase effect, *B. influenzæ* only gives a slight one.

(4) Secretions taken from the larynx, trachea, bronchi, and lungs of 50 children under 10 years of age dying from diseases other than whooping-cough and cultured on Bordet-Gengou media were not found to contain *B. pertussis*, although *B. influenzæ* was quite often detected in them.

(5) The bacteriological diagnosis of whooping-cough if generally adopted would probably be found to be easier and more exact than that of diphtheria and could be of practical service to the community.

We are indebted to Dr. Angus Campbell, of St. James's Hospital, Leeds, for help in obtaining some of the specimens of sputum examined, and to Prof. M. J. Stewart, Leeds, for access to the material from autopsies.

Bibliography.

Andrewes, F. W.: Report on Influenza to the Ministry of Health 1920, p. 115.

Bordet, J., and Gengou, O.: Ann. de l'Inst. Pasteur, 1906, xx., 731, and 1907, xxi., 720.

Bordet, J.: (1) Détails complémentaires sur le microbe de la Coqueluche. Extrait du Bulletin publié par la Société roy. des sci. méd. et nat. de Bruxelles, May, 1907. (2) Etiologie de la Coqueluche. Extrait du Bulletin de l'Acad. roy. de. med. de Belgique, Nov., 1908. (3) Brit. Med. Jour., 1909, ii,, 1062. (4) Centrbl. für Bakt., 1912, lxvi., 275.

Freeman, J.: Brit. Méd. Jour., 1909, ii., 1062.

Ellingworth, S., McLeod, J. W., and Gordon, J.: Jour. Path. and Bact., 1929, xxxii., 173.

Kristensen, M.: Doctor's Thesis. (Published in the Communications de l'Inst. Sérothérapique de l'Etat Danois, 1922, xii).

Nishibe, M.: Scientific reports from the Government Institute for Infectious Diseases, Tokyo, 1926, p. 185 and 195.

Scheller, R.: Deut. med. Woch., 1912, xxxviii., 1825.

Wollstein, M.: Jour. Exper. Med., 1909, xi., 41.

THE MANAGEMENT OF THE PSYCHOSES OF MIDDLE LIFE.*

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IT has been recognised for many years by those in mental hospital practice that mental symptoms of a severe type frequently make their appearance in persons between the ages of 40 and 60 years. Recently however, with the growth of out-patient clinics for psychiatric cases, it has become clear that minor degrees of mental disturbance at this time of life may exist for many months before the patient is committed to a mental hospital, and that there were previously many such cases which never came under the care of psychiatrists at all. These cases appear to be a source of continued anxiety and distress to the relatives and the family physician, and their management is therefore of general interest.

It is the object of this contribution to indicate the methods of clinical approach to such cases as a whole, and to formulate criteria on which prognosis and management may be based. The title of this paper may have suggested the concept of a condition designated "involutional melancholia," and associated in some way with the menopause. Such a concept is misleading, for two reasons: in the first place, it is not in accordance with observed clinical fact. In many cases, the mental breakdown is separated from the menopause by a number of years on either side; and, furthermore, the symptoms of so-called involutional melancholia are often observed in men at the prime of life. In the second place, the name involutional melancholia implies the existence of a fixed symptomatology resultant upon some underlying fixed disease entity. The truth is that there are many clinical types of psychosis which may develop in the middle period of life. Some of them are associated with gross organic disease, some with functional physical changes, while in some it is not possible to demonstrate any physical change at all. The precipitating cause of a psychosis at this period of life may be one of many. It may be organic disease of the brain, or of the somatic field; it may be some environmental disaster, such as financial ruin; or it may be some inner difficulty of the patient's, about which he is unwilling to talk, or of which, even, he may be unaware, because such difficulties may have their true core in the subconscious.

The precipitating cause has but little effect on the symptomatology, for the symptoms are coloured and conditioned by the personality of the individual himself. This is concisely expressed by saying that when an individual breaks down mentally, he does so along the lines of his personality. The psychosis is, as it were, the distorted reflection of the individual as he was before he became ill. For this reason, the family physician can be of great help to the psychiatrist, and has, if he chooses to use it, a strong weapon of defence and prophylaxis against the psychoses. He knows the personalities of his patients. The psychiatrist knows what types of personality are liable to develop psychoses, and, further, of what nature these psychoses are likely to be.

Types of Psychoses Depend on Personality.

I will not dwell on personality descriptions, for their name is legion; but we may, I think, take two figures from literature for purposes of illustration. On the one hand, Cassius, with his lean and hungry look, and his propensity for thinking too much, typifies a personality which is prone to develop the malignant type of psychosis. At the other end of the scale is the fat, boisterous, jovial Falstaff, in whom a psychosis—if it occurred—would most probably be of the benign type. Between these extremes are

* A paper read before the Cardiff Medical Society, Jan. 8th, 1929.

infinite gradations; and it has been demonstrated clinically that the likelihood of recovery or otherwise corresponds closely to the position of the patient in the scale. Any attempt, therefore, to draw a composite clinical picture of the mental disorders of this period of life is unsatisfactory, because of their very nature. Clinical psychiatry is essentially the study of the individual patient. Psychotic symptoms, when they occur, are as variegated as the patients themselves; and this is true even of general paralysis. No disease is more protean in its early manifestations. Sometimes it is the patient, sometimes the relatives who seek advice; perhaps more commonly the latter. When this is so, there is a regrettable tendency on their part to embroil the medical man in some undignified subterfuge. One has heard, for example, of a psychiatrist being asked to call at the patient's house in the guise of the man who comes to wind the clocks. Cases are not unknown where the medical man has condoned such methods, by inviting the patient to come for a drive in his car and then depositing him within the precincts of a mental hospital, the true nature of which is not revealed. Such methods cannot be too strongly condemned; there is absolutely nothing to gain by them. Patients do not readily forget such deceitful practices, and they regard as an enemy not only their own physician, but possibly the profession as a whole, and thereby increase the difficulties of the case.

Examination of the Patient.

From every point of view it is desirable that the medical man should be open and frank. Let him tell the patient that his relatives believe him to be ill, and that he has come, in the capacity of a physician, to examine him. If the patient is truly psychotic, nothing that he may do will hide his symptoms from one trained to elucidate them; while, if he is not psychotic, there is no harm done.

A routine physical examination is, of course, essential; but it is generally desirable, if the case is not obviously one of gross physical illness, to make the mental examination first. There is only one satisfactory way to do this. It is to write down what the patient actually says and does, and the setting in which he says and does it. These are matters of fact, anything else is a matter of opinion. To say that a person is deluded, hallucinated, confused or irrational is merely to express the opinion of the examiner; but, if one writes down, for example, the question, "Do you seem to hear voices?" and the reply, "Yes, like electricity in the head"; or the question, "What year is this?" and the reply, "1899," when it is actually 1929, then one has a permanent record of fact, which may become incontrovertible documentary evidence should legal complications arise later.

The special fields we want to investigate in the mental examination are three in number: (1) The emotional state or mood of the patient. (2) What the patient is thinking about; that is, the content of thought or mental trend. (3) The state of his purely intellectual functions. By "intellectual functions" one means memory, ability to retain simple facts, ability to do calculations, and to orientate one's self in time and place.

1. *The mood.*—The indications of the state of the mood are the patient's facial expression, gesture and attitude, and his statement of how his feelings and spirits are. A psychosis may manifest itself in three ways in this field. They are as follows:—

(*a*) By exaggeration of the emotional state, with or without apparent cause. For example, a patient becoming profoundly depressed after some trivial financial loss, or for no apparent reason at all.

(*b*) By the presence of apathy or a mood which is not in harmony with the patient's thoughts. The commonest example of this is where the patient states that he is being annoyed or interfered with in some way and yet does not, in spite of superficial protestations, show any real resentment thereto.

(*c*) By instability of the mood—where, in the course of a few minutes, the patient will laugh or weep without apparent cause, and will change from laughter to tears very quickly.

The state of the patient's mood gives us some clue to the questions we should ask in the investigation of the next field, viz.:—

2. *The content of thought.*—For example: "Why are you unhappy?" "What do you think is the cause of your depression?" "What are you afraid of?" When investigating the content of thought, we must find out whether the patient's experiences are real or imaginary, and whether his personal beliefs are generally accepted as correct or erroneous. In other words, are his thoughts made up in part of hallucinations and delusions? This often involves the use of leading questions.

3. *Investigation of the intellectual functions of memory, orientation and reasoning.*—The proper mode of approach is to ask the patient about chronological events in his life, beginning with the time he left school following it through such events as employment, marriage, children, deaths of parents, &c., and public events, such as the war and the general strike. Make him give as many dates as possible; and when he tries to gloss over some period, go over it in particular detail, afterwards comparing notes with the relatives. In this way, instances of amnesia or confabulation become apparent. Be particularly on the look-out for incongruities, instanced by a patient who said she was employed as a nurse in 1921, and after that went to make munitions.

Orientation is simply tested by asking the patient if his head feels clear, if he knows the date, where he is, and identifies those about him correctly.

Reasoning is most readily determined by asking the patient to do a few simple calculations.

Having completed the mental examination in this way, we find in a psychotic case that, although there may be changes in all these fields (namely, the mood the content of thought and the intellectual function), the change in one of them usually overshadows the others and dominates the clinical picture. Thus, we have three broad types of psychoses: (1) Those in which some profound emotional disturbance dominates the picture. We call these the affective disorders. (2) Those where there are hallucinations or delusions, without much emotional change. These are the paranoid psychoses. (3) Psychoses characterised by impairment of the intellectual functions—the organic psychoses.

The Affective Disorders.

In the affective disorders, the prognosis is generally good. The more acute the onset, and the more dramatic the symptoms, the sooner will the patient recover. Acute cases recover in from three to six months, while cases of gradual onset and less profound change take from five to seven years to run their course. If, in addition to the emotional change, such patients have definite delusions of unworthiness, sinfulness, or fear of torture, then certification must be resorted to. Many cases of affective disorders, however, do not present definite delusions, but have mental trends of a self-depreciatory kind; they feel "no good," or wretched; the difference is only one of degree. In that event, the management of the case depends on the financial status of the patient. If he can afford it, he should go to a registered hospital as a voluntary patient; and the sooner he is in hospital the better. He will be in the hands of people who understand his illness; cared for by nurses trained to deal with such cases; in a place properly equipped for the treatment, by physical, psychological and occupational means, of the illness from which he suffers. There should be no hedging about going to hospital. The situation must be faced and dealt with. It is the duty of the profession to kill the old, fatalistic attitude to mental hospitals. The patient and the relatives should be made clearly to understand that the sooner the patient is in hospital the better his chance of early recovery. One hears all sorts of arguments about the unfortunate effect upon the patient of placing him among a lot of "lunatics." There are two answers to this: one is that these cases are often worse at home than in hospital; and the other is that one has never seen or heard of a patient being definitely, unfavourably affected by being in

an environment of people suffering from a kind of illness similar to his own. Moreover, any psychiatrist can tell of innumerable cases which have become certifiable and have run a protracted course, when voluntary admission to hospital in the early stages would have resulted in recovery long since.

If the patient is in straitened financial circumstances he cannot go as a voluntary patient to the ordinary rate-aided hospital in England. Such patients must be treated at home, preferably with regular visits to some out-patient clinic for psychiatric cases. It is important that the sleep and weight be recorded carefully. To secure sleep and diminish agitation, veronal in 5 or 10 grain doses, thrice daily, is effective. It should not be continued too long; and, after a week or so, bromide in 30 grain doses, t.i.d., may be substituted. The gospel of fatness has stood the test of time; and by means of gastric tonics, cod liver oil, arsenic and iron, the weight should be built up. Drug therapy, however, only helps us in the alleviation of symptoms. The psychosis is a distortion of the individual as a whole. We all know how easily habits are developed. Now, psychotic behaviour and modes of thinking are apt to become a habit with the patient, and so set up a vicious circle. We should endeavour, therefore, to make the patient develop habits of ordinary behaviour and ordinary thought.

The two great means of doing this are occupation and persuasion. Make the patient do something—no matter how simple, be it sewing, reading, painting, carpentry; anything so long as he is occupied, preferably with some creative work; something he can look at and realise that he has done himself. In this way, nor only do we tend to keep the patient's thoughts off himself, but we restore his broken self-regard and feeling of usefulness. Occupation is not suitable for the more acute forms of these psychoses. It is a mistake to force the pace too much, but firmness is essential; and we must be guided by the condition of the patient. In any case, a patient who is suitable for home treatment is, in all probability, suitable for occupational therapy. Persuasion is more logical than crude suggestion, and less coldly intellectual than argument. It means not only pointing out to the patient that he is ill, that he must regard his distress as a symptom of illness, and that he will get well; but we must stimulate him; point out his duty to others; fill him with hope, and reason out his little troubles one by one as they arise. Make him feel that we understand him, and that we want to help him; give him some model on which to arrange his life; give him a daily programme, and let him take a pride in keeping to it; for discipline is of great help in restoring a feeling of self-regard in patients suffering from these psychoses. Finally, the possibility of a suicidal attempt in states of depression must never be forgotten; and the relatives should be warned not to let the patient be alone.

The Paranoid Psychoses.

The next group, the paranoid psychoses, with their lack of emotional disturbance, but profound change in the content of thought, are extremely unfavourable cases, usually of long and insidious onset, and eventually ending in a fixed delusional system. Early certification is desirable, not only from the point of view of the patient, but also from the social point of view. Many of these patients get themselves into difficulties with neighbours, the police and other public bodies, because they think they are being watched or persecuted, or because they believe themselves to have some great reformatory mission in life. As soon as one can write down some odd belief of the patient's, which, in non-technical terms, clearly demonstrates his lack of insight into his condition, he should be certified. Because of this lack of insight it is usually impossible to get the patient to go voluntarily to hospital. On the subject of certification it may be said, in passing, that the writer of the certificate, no matter how often he has written one, should bear in mind two things: (1) to read carefully and obey to the letter the marginal notes and instructions on the certificate form; (2) to put down only matters of fact—not opinion—and to avoid technical terms, remembering that his certificate has to convince a layman of the patient's unfitness to manage himself or his affairs.

The Organic Psychoses.

The last group are the organic psychoses, characterised by intellectual impairment. Now, intellectual impairment is an almost infallible criterion of actual disease, injury or poisoning of the brain. We may, therefore, usefully recognise two sub-divisions of this group. They are: (*a*) psychoses with organic brain disease. (*b*) Psychoses with other somatic disease. Both of these sub-divisions call for special physical investigation. We should, therefore, get the patient into a nursing home or general hospital—according to his financial status—in order to do the following: lumbar puncture; fundus oculi examination; blood pressure; microscopical urine examination and kidney-function tests; complete blood count. Our lumbar puncture will settle the question of general paralysis, cerebral syphilis and a few other organic nervous diseases. If we find evidence of general paralysis, then malarial treatment should be given if the cardiovascular condition is satisfactory. Many cases are sufficiently well mentally to permit of this being done in a general hospital. If syphilis can be ruled out, we should seek carefully for evidence of arteriosclerosis in the urine, blood pressure and fundus oculi. Many arteriosclerotic patients have exacerbations of mental symptoms from time to time, and sometimes, in such exacerbations, they are certified. Unless excitement is extreme, this is not a justifiable course to take without first trying the effects of free purgation, by saline purgatives, diminution of protein intake and exhibition of iodides. It is surprising how many patients, apparently with arteriosclerosis, show a great mental improvement under such treatment. If syphilis and arteriosclerosis can both be ruled out, alcohol should next be considered; and here the history should help us. The prognosis for acute attacks in alcoholic psychoses is very good, and most of them may be treated at home; but, of course, future attacks are extremely likely to occur, unless the patient is willing to go to hospital for a prolonged period. Lastly, if all these conditions can be ruled out, we must seek some gross infection. A leucocyte count should help us; and, in addition to the usual places of focal infection, the urine should be examined bacteriologically, because a *B. coli* infection of the urinary tract is not rarely the focus, and one can recall at least one miraculous cure of a psychosis by the exhibition of large doses of bicarbonate of soda.

Summary.

Three types of psychosis are seen in middle life. They are: (1) The affective disorders, where exaggeration of the emotional state is the cardinal symptom. (2) The paranoid psychoses, characterised by delusions and hallucinations, without much emotional change. (3) The organic psychoses, characterised by intellectual impairment.

In the affective disorders, the prognosis is good in direct proportion to the acuteness of the symptoms. Certification, voluntary admission and home-treatment are appropriate to varying degrees of the disorder. The paranoid psychoses are unfavourable, and call for certification. The organic psychoses may be associated with disease of the brain, or with other somatic disease. The presence of syphilis, arteriosclerosis, alcohol or gross infection should be determined by extended physical examination. Many cases in this group—particularly those associated with arteriosclerosis, alcohol and gross infections—are capable of being satisfactorily treated under home conditions.

A brief survey of a large clinical field is necessarily didactic. There are exceptions to the rules I have formulated, but I have endeavoured to present a large field as a whole rather than to side-track the issue by a wealth of minute detail.

Clinical and Laboratory Notes.

THE MEINICKE MICRO-REACTION.

By G. DE M. RUDOLF, M.R.C.S. Eng., D.P.H., D.P.M.,
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MANY tests have been devised with the object of obtaining some simple reaction for the detection of syphilis, but perhaps none is so simple as Meinicke's micro-reaction. The blood may be obtained from a prick, and the apparatus consists of platinum loops, microscope slides and cover-slips, a microscope and an antigen which is stable and can be bought ready for use. Although the reading of the test requires some experience, the technique is simplicity itself. Full details of the technique are sent with the antigen by Meinicke but will be found in English in a paper by Prentice in this journal.[1]

At the suggestion of Dr. G. F. Barham, medical superintendent of Claybury Mental Hospital, a number of sera have been examined by this test. The Wassermann reactions (W.R.) were performed on the same sera at the central laboratory of the London County Mental Hospitals Service by Mr. F. Partner under the direction of Dr. F. L. Golla, the director.

The accompanying table shows the results obtained together with those of some other workers. Of a total

—	Claybury.	Saunders.	Rucker and Whitby. I.	Rucker and Whitby. II.	Kovacs.	Prentice.	Total.
W+ M+	29	111	57	149	461	400	2461 (89·3%)
W— M—	302	799	151				
W ? M ?	2	—	—				
W.A. M—	—	9	—	11	—	29	103 (3·7%)
W.A. M+	—	13	—		—		
W ? M+	—	8	—		—		
W ? M—	4	7	—		—		
W+ M ?	2	5	—		—		
W— M ?	42	13	—		—		
W+ M—	22	16	15		11		186 (6·8%)
W— M+	43	19	12		48		

W = Wassermann reaction; M = Meinicke micro-reaction.
A = Anticomplementary.
+ = Positive. — = Negative.
? = Doubtfully positive or doubtfully negative.

of 2750 specimens examined 89·4 per cent. agreed with the results of the W.R. The percentage of agreements varied in the different series from 74·4 (Claybury) to 93·3 (Prentice[1]). When it is recalled that all the workers used practically identical techniques for the Meinicke micro-reaction, but that different techniques would be employed for the W.R., the high percentage of 89·4 for the total series is striking. Rucker and Whitby[2] carried out two series of tests. Column 1 under their names in the table shows the results obtained with an antigen prepared by these authors similar to Meinicke's own extract but without previous extraction of the horse-heart muscle with ether, whereas Column 2 shows the results obtained by these workers when Meinicke's own extract was used. The agreements were 88·5 per cent. in Column 1 but 93 per cent. in Column 2.

Rucker and Whitby point out that the chief difficulties in the reading of the tests occur in the sera from treated cases. Kovacs[3] believes that the test is definitely reliable in untreated cases and the statement has been made that the reaction is more sensitive than the W.R. Of 19 sera examined by Saunders[4] and giving negative W.R. with positive Meinicke micro-reactions, 11 came from patients who had had syphilis or had shown positive W.R. previously. Of 16 sera tested by the same author and giving positive W.R. with negative Meinicke micro-reactions 11 came from cases of general paralysis who had been given a course of two years' treatment with tryparsamide and salvarsan continuing up to two weeks before the tests.

In conclusion my thanks are due to Mr. F. C. Radley, laboratory assistant, Claybury Mental Hospital, for assistance in the work, and to Dr. Barham and Dr. Golla for permission to publish the results.

References.

1. Prentice, D.: THE LANCET, 1928, i., 493.
2. Rucker, E. A., and Whitby, L. E. H.: Brit. Jour. of Exper. Path., 1928, ix., 30.
3. Kovacs: See THE LANCET, 1926, ii., 875.
4. Saunders, A. P.: Arch. Path. and Lab. Med., 1926, i., 388.

A NEW METHOD OF MAKING A PERMANENT SUPRAPUBIC OPENING.

By W. CUTHBERT MORTON, C.B.E., M.D. Edin.,
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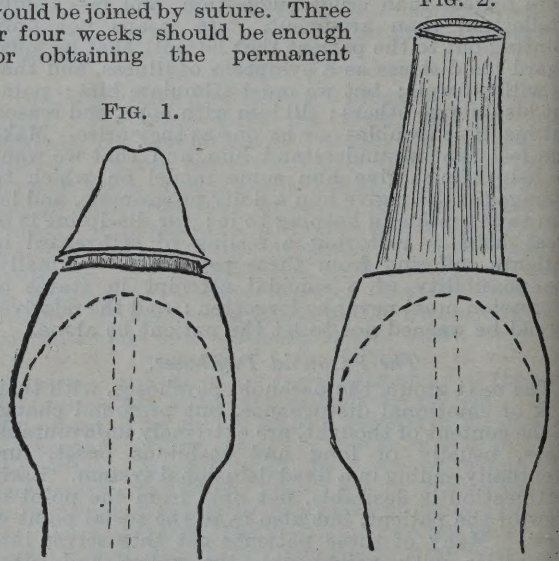
PROSTATECTOMY leaves nothing to be desired when it succeeds; too often it either cannot be done or else fails. If the operation is performed the general practitioner must be prepared to lose a life otherwise good; if it is not performed, he may have to take part in the humiliating ritual of a painful catheterism or to stand by for a year while nature lines a suprapubic opening.

Two most unfortunate cases led me to wonder whether there might not be scope for a permanent opening lined by a tubular graft of the prepuce. At a first operation the distal margin of the protracted prepuce would be incised circularly and the inner layer inserted through a freshly made suprapubic opening so that its distal margin could be sutured around the incision in the bladder wall, after which the distal margin of the outer layer would be sutured around the cutaneous incision no raw surface being left exposed. At a second operation, when the graft should have taken, circumcision would free it and its cut edges would be joined by suture. Three or four weeks should be enough for obtaining the permanent opening, and contraction of the linea alba might enable the urine to be held for some hours. The catheter, should it prove necessary, would cause little pain since the nerves to the graft would have been cut by the circumcision.

FIG. 1.

FIG. 2.



Diagrams showing incision in outer skin of the prepuce.

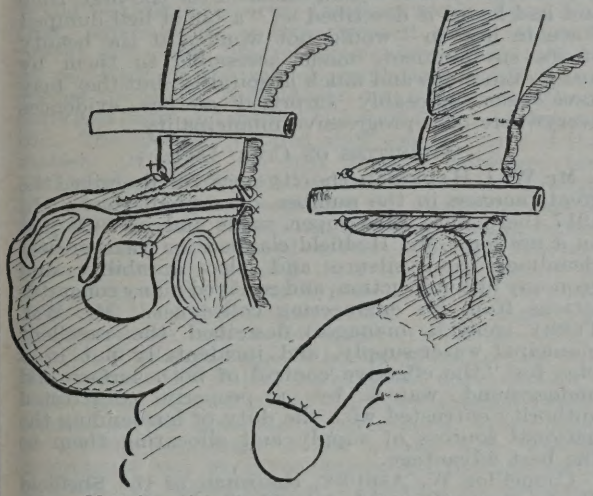
Description of the Operation.

Mr. L. R. Braithwaite, with whom the question was discussed, at once arranged to try the method on the first suitable case. I am indebted to him for the following description of the operation and above all

for the interest which he has taken in the method and for the successful issue which means so much to my patient.

"The patient was a man 65 years of age, with a urethral stricture of such a kind that it was impossible to pass the finest bougie through. A radiogram of the injected track through the stricture showed it to be not only an exceedingly narrow one but also

FIG. 3. FIG. 4.



Mesial section. Oblique section.

one of the 'corkscrew' variety, too extensive in its length for successful excision or incision. Cystitis of the foulest type had developed and the condition of the patient was so low that a suprapubic drainage had become essential two months before the new operation was attempted. As a result of drainage and lavage the degree of cystitis was much diminished.

"Provision must be made for temporary bladder drainage during the fixation of the pedicle graft. In this case the usual incision above and very close to the symphysis pubis had been already made and a self-retaining catheter was acting as a 'permanent' bladder drain.

"The catheter having been removed, the whole of the track from skin to bladder wall was excised, the wound being lengthened at the same time so that it was about two inches long. With a finger through the wound an incision was made through the abdominal wall into the bladder, one and a half inches above the level of the upper edge of the lower incision. Into this upper wound the temporary bladder drain was placed (Fig. 3). The prepuce, having been drawn out fairly tightly, was encircled by an incision about half-way along its length, dividing the outer skin of the prepuce only (Fig. 1). The distal cuff of skin was then drawn forwards (inverted) (Fig. 2), making a long tube, lined by skin on its inner side. This tube was to be made to lie in the substance of the abdominal wall from skin to mucous membrane of bladder. The elongated cuff of prepuce was now drawn through the prepared track and fixed by six fine catgut stitches accurately to the bladder edge (Fig. 3). The old abdominal wound was now stitched closely up to the preputial tube and that portion of proximal preputial outer skin left covering the glans was easily stitched to the abdominal skin at the margins of the old suprapubic wound, drawing the glans fully up to the abdomen.

"Some œdema of the prepuce developed outside the abdominal wall, but no evidence of impending gangrene. After 14 days a circumcision was performed and the penis allowed to fall back (Fig. 4). In three days the tube in the upper suprapubic wound was removed and another smaller tube placed along the new track now fully lined by preputial skin. In 10 days the upper suprapubic wound was completely closed by natural means. For three or four weeks the preputial graft remained swollen and œdematous, after that time it became normal and has shown very little, if any, signs of contraction. The skin-lined track has certainly become much narrower but no more than is necessary to keep it watertight. The result has been very gratifying. It is of interest to quote from the patient's letter to Dr. Morton, dated May 7th, 1929:—

"I find it only necessary now to pass water about once in five or six hours—never less than four hours—using a short silver or plated catheter, No. 8, which of course means getting a good night's rest. No leakage occurs unless, through force of circumstances, I am obliged to disregard the warning desire to relieve the bladder, and then a small quantity, say about a tablespoonful, is passed through the urethra only. Believe me, my best thanks will always be due to yourself as the inventor of the operation, and to the surgeon who performed it at the infirmary, and afterwards directed its treatment.

"Seen a few weeks ago the patient was wearing no dressing of any kind over the new opening, it was perfectly dry, and showed no sign of irritation. The new track was free from all pain or tenderness and the introduction of the short straight tube was accomplished with the utmost ease and celerity. There can be no doubt whatever that the operation has its use though obviously limited by reason both of sex and sect."

HEPATIC AMŒBIASIS SIMULATING CHOLECYSTITIS.

DRAINAGE OF ABSCESS BY CHOLECYSTOSTOMY: RECOVERY.

BY IAN MACDONALD, M.D. EDIN.

IN a valuable paper on hepatic amœbiasis, based on a surgical experience of 252 cases, Lacaze and Melnotte[1] emphasise the difficulties of its differential diagnosis. Confusion with cholecystitis and appendicitis is apparently not infrequent when the attacks are periodic and associated with rigidity of the right side. In the case reported here, the preoperative diagnosis was cholecystitis and appendicitis, though the possibility of an amœbic abscess was not forgotten. Conservation of the gall-bladder fortunately allowed satisfactory drainage of the abscess.

The patient, a military man aged 39, was admitted suffering from acute pain in the right hypochondrium and right side down to the iliac fossa, with irregular fever, which had reached 103° F., accompanied by sweating and chills. Pain had been so severe that morphia had been necessary night and morning for a week. He had had one previous attack of dysentery 18 years before in Morocco. He had suffered in ten years from three similar attacks of pain, which had been diagnosed as biliary lithiasis. During the last eight months the attacks had been more frequent, but in all the intervals the patient had been quite well. He was a thin, sallow-looking man with a subicteric tint. Palpation elicited great pain down the right side as far as McBurney's point. Palpation for abscess laterally and posteriorly between the ribs was quite negative. The patient insisted on the severity of his subcostal and right-sided pain. Percussion of the liver seemed to show enlargement, but even light percussion was extremely painful and the right rectus muscle was continuously contracted. There were no urinary symptoms nor antecedent dyspepsia. In the attacks the pain radiated upwards towards the chest, shoulder, and back. On admission more morphia had to be given as the pain was so severe, but the pulse-rate was only 80.

Operation.—Under ether anæsthesia the abdomen was opened by a long Kocher incision with a short vertical prolongation upwards in the middle line. A large liver was exposed, and on lifting its anterior edge a very thin-walled, dilated gall-bladder prolapsed into the wound. The gall-bladder was about four times its normal size and had the colon fixed along its under surface. This adhesion, however, proved to be a fine flattish fold; on cutting it the neck of the gall-bladder was easily reached. Palpation of the ducts revealed no stones and it was difficult to account for the obvious stasis in the gall-bladder. Palpation of the upper and lower surfaces of the liver showed no definite abscess, but needling was not employed. The gall-bladder was next

[1] Lacaze, H., and Melnotte, P.: Rév. de Chir., 1928, lxvi., No. 10.

opened after emptying it of foul-smelling, black bile; it contained no calculi. In view of the poor condition of the patient, the obviously enlarged liver, and the uncertainty of the nature of the cholecystitis, simple cholecystostomy was selected as least likely to cause trauma to the liver. A piece of omentum was fixed between the raw surfaces of the gall-bladder and colon and a large Pezzer catheter was placed in the gall-bladder. The appendix was then removed, without invagination of its stump, through a small McBurney incision. It was obviously diseased, contained two stercoliths, and was acutely kinked about the centre.

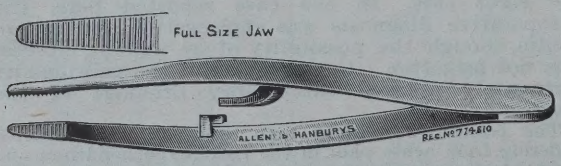
The immediate results of the operation were excellent. The acute crises of pain at once ceased and a large amount of black, fœtid bile was discharged by the tube. On the third day, however, the bile became turbid, and slimy pus, with pieces of necrotic material mixed with small blood-clots, was evacuated by the tube. Though a laboratory report of the pus and fæces was negative for amœbiasis, the clinical diagnosis was now clear. Four centigrammes of emetine were administered night and morning for twelve days, and 50 cg. of stovarsol were given daily by the mouth. The purulent discharge rapidly lessened and in ten days the bile was practically clear of pus. The tube was removed on the nineteenth day and the patient left, with the wound soundly healed, one month after admission, with instructions to continue the emetine treatment during a fortnight in each month. Three months later he was in excellent health.

Huelva, Spain.

New Inventions.

AN IMPROVED ARTERY FORCEPS.

THIS is a modified dissecting forceps having jaws similar to the standard Spencer Wells's artery forceps, and is fitted with an improved spring catch which locks, when compressed, and unlocks with further compression. The forceps can be readily manipulated



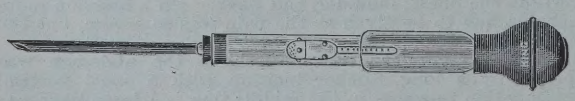
in the hand, there being no delay in inserting digits into rings as in ordinary forceps and they can be gently and easily removed with either hand, even by an unpractised assistant.

These forceps have been made to my special design by Messrs. Allen and Hanburys, Ltd., Wigmore-street, London, W.

HUGH DONOVAN, M.B., Ch.B. Birm., F.R.C.S. Eng. and Edin.

A LABOUR SAVER IN THE EXAMINATION OF URINE.

Disliking the task of filling test-tubes direct from a pot and having to wash up a greater number of pieces than necessary, I have had a battery hydrometer



adapted for urine. This instrument, shown in the illustration, will pick up a specimen from any kind of vessel, give the specific gravity, and fill a test-tube without spill or mess. The usual cleansing of pipette urinometer and trial jar is reduced to the one simple operation of drawing in clean water and squirting it out again.

The hydrometer may be obtained from Messrs. A. Charles King, Ltd., 34, Devonshire-street, London, W.

G. RAMSEY PHILLIPS, M.R.C.S.

ROYAL SANITARY INSTITUTE.

CONGRESS AT SHEFFIELD, JULY 13TH–20TH, 1929.

THE fortieth annual congress of the Institute was in some ways the most successful of the long series. Its keynote was coöperation. One notable event was that the congress set its seal on the inclusion of mental hygiene within the purview of public health. The delegates who visited Sheffield for the first time and had heard it described as "a bit of hell dumped down in heaven" would not wonder at the beauty of its environment, made accessible to them by many excursions and much hospitality, but they may have been agreeably surprised at the evidences everywhere of a progressive municipality.

AMENITIES OF CIVIC LIFE.

Mr. W. J. HADFIELD, the city surveyor, described the great increase in the number of asphalt roads. In 1917 there were 1316 super. yards and in 1929 just on a million. Mr. Hadfield claimed for them greater cleanliness and silence and also durability and economy in construction, and received many congratulations from his engineering colleagues. Mr. WM. TERRY (general manager) described the excellent municipal water-supply, and incidentally put in a plea for "the effective control of both surface and underground waters by a properly constituted authority entrusted with the duty of husbanding the national sources of supply and allocating them to the best advantage."

Councillor W. ASBURY, chairman of the Sheffield Health Committee and of the Sheffield and Rotherham Joint Smoke Abatement Committee, presided over a good discussion on smoke abatement, and advocated that the whole country should be mapped out into regional areas, each controlled by a joint committee with statutory powers. When this had been done a central committee could be formed to consider the best method of tackling the problem on a national scale and to conduct research work and arrive at a uniform standard. The Rogers Field medal, the principal award offered by the Institute, was won by Low Temperature Carbonisation, Ltd., for an exhibit of Coalite Radiant Smokeless Fuel. This medal has only been awarded twice previously during the past 25 years.

During the discussion Mr. H. G. CLINCH (chief sanitary inspector, West Ham) referred to a similar coke produced by the Gas Light and Coke Company and sold under the name of Gloco. The delegates who saw the Coalite fire burning in the exhibition must have agreed with Mr. Clinch that when such a smokeless fuel is available generally at a reasonable price no hardship will arise from the prohibition of the use of raw coal for domestic purposes and the domestic smoke problem will have been solved.

Most of the delegates utilised the efficient municipal tramway and motor-bus service, many visited the sewage disposal works to see a good illustration of the bio-aeration system, and the new municipal abattoirs received unqualified praise.

The discussions held and the papers read at the 12 sections and conferences were very numerous, and it is only possible to refer to a few of them in detail.

MENTAL HYGIENE.

The first session of this discussion was devoted to the interests of the child and the second was from the point of view of the adult. Prof. ARTHUR HALL, who presided, referred to the pioneer work of Wycliffe Wilson, who had always attached great importance to the moral and mental effect of the "scattered homes" for poor-law children, for the origination of which he would always be gratefully remembered. He went on to refer to the out-patient department of the South Yorkshire Mental Hospital, which was endeavouring to get hold of early cases, but also needed beds for short-stay cases.

The Child.

Dr. RALPH H. CROWLEY opened the discussion on mental hygiene for the child. This was, he said, an

extraordinarily difficult undertaking. The gaps in our knowledge as to the prevention of undesirable and harmful mental states should warn us against undue optimism. We needed to learn the significance of behaviour problems in general and for any particular child. Only after much patient work should we learn what abnormalities in behaviour were significant, at what age and in what combinations; and what are probably the forerunners of delinquency, of crime, of nervous disorder, of insanity. A public organisation would be needed to secure the team work of psychiatrist, psychologist, welfare worker, nurse, teacher, parent, and child. The retarded children, who formed 10 per cent. of the school population, would claim special attention. A child who was a failure at school early lost heart and made a bad start for his adolescent life. The specially trained staff was the crux of the matter. Hitherto we had devoted ourselves too exclusively to the manifestations of the mind through the intellect and had neglected the manifestations of the mind through behaviour, and there was in consequence much undeveloped creative activity. Men and women were not making their full contribution to the common life. Mental hygiene must take its place as part of the public health service. The resources of the community must be brought to the service of the individual at each stage of his life so as to give him the chance of the fullest and highest development.

Dr. WM. MOODIE (Child Guidance Council Clinic) referred to the anxieties of parenthood, which could be greatly minimised if the parent were warned beforehand and given confidence to face potential troubles. "Parent teacher" associations, pre-natal clinics, and nursery schools could do excellent work. For the effective working of child guidance clinics it was essential to have specially trained social workers, because parents and relatives could not accurately and impartially describe their problems, which had an effect on the child.

Dr. LETITIA FAIRFIELD referred to the large amount of obscure talk about psychology. At present they only dealt with end-results; yet naughtiness was more important, though perhaps less interesting than criminology. They must spread the knowledge of psychology to all who had to care for children. Consultant clinics for difficult cases were needed. The period under five years was the most important, but it would be ridiculous to have child guidance clinics for that age, and they must work through the mothers and the teachers, through maternity and child welfare centres and nursery schools. There was not enough character training in the maternity and child welfare centres and there were not enough "McMillan" nursery schools. At the age-period from 5 to 16 the child only spent a fraction of his life at school. In America they had endeavoured to fill this gap by appointing home-visiting teachers. An out-patient mental clinic could not work successfully without expert home visitors. In Canada the work of ascertaining mental deficiency was being extended to conduct troubles and problems, and the school nurse was specially trained in mental hygiene. Child guidance clinics would be a great disappointment if they were not conducted by real experts.

Dr. EVELYN FOX (Hon. Secretary, Child Guidance Council) stressed the importance of social workers being trained in this dangerous and difficult work. The medical profession did not yet appreciate what was meant by a mental-hygiene social worker. They must create a demand for such workers, who would be the passers-on of the skilled advice of the psychiatrist to the family.

Dr. G. A. AUDEN (school medical officer, Birmingham) pointed out that nursery schools could not put right home maladjustments. The parents of only children needed instruction that their child had to live its own life and must learn to stand alone. The sense of inferiority in school work was often the beginning of trouble.

Dr. A. E. NAISH agreed that the mental upbringing of children was neglected, but said we must go slowly. Years of study were needed and mental hygiene would be an art and not a science for a long time. At early ages we must work through the mother. Unless we had good instruction to give it was better to give none at all. The child must be given its own reasons for controlling its emotions. Councillor OLDERSHAW (chairman of the Health Committee, Maidenhead) said that in his experience as a crammer he had to deal with many "only child" and "step-mother" failures. He sounded a note of warning as to the trouble caused by bad psycho-analysis.

Dr. HARVEY SUTTON (New South Wales) said that it would be necessary for the child guidance team to keep an all-round view and not neglect the physical side. For example, deafness might lead to incorrigibility. The school medical officer needed some training in psychiatric work. Dr. COLSTON WILLIAMS (Glamorganshire) asked how we were to make a beginning.

The Adult.

Dr. E. MAPOTHER (superintendent, Maudsley Hospital) said that in a wide sense the aim of mental hygiene was the abolition of madness, badness, and sadness. He found that mental disorders only had an organic origin in 25 per cent. of the total, and that there was a distinct decline in the cases caused by alcoholism and syphilis. As regards functional mental disorder there was no true prophylaxis as yet, only the possibility of early treatment. It was impossible to shelter the potential neurotic from injurious experience, and many of the world's greatest achievements had been made by the unstable facing the risks of a breakdown. Even from the neurotic's own standpoint it paid better to live dangerously than to play pawky. Dreary second-rate lives were a more frequent cause of mental disorder than overwork or disaster and the infliction of security through renunciation was the worst of services except on real proof of necessity. The pivot of the system of early treatment was the psychopathic clinic, and at present the only English example was the Maudsley Hospital. In its first six years this hospital treated 3000 in-patients and 7000 out-patients. None of these patients had ever been certified and less than 1 in 8 had left against advice—just because they were free to do so.

Dr. W. VINCENT (medical superintendent, Wadsley) said that every public hospital should have its special department for incipient mental disease. There should be beds available as well as an out-patient department, and specially trained home visitors on the staff. Dr. R. W. GILMOUR (lecturer in psychiatry, Middlesex Hospital) held a brief for the minor mental and functional nervous disorders. The alienist was more interested in the individual and the physician or hygienist in the case, but they were all coming together gradually. The wrong mental interpretation of sensations was a great source of misery and was not cured by saying "Don't be silly!" Early mental symptoms needed treatment just as much as early symptoms of physical disease. Mental defect due to birth injury was not transmissible to the children. Much was said about the inferiority complex, but he considered the superiority delusion just as important.

Mrs. C. B. S. HODSON (the Eugenic Society) said there was a distressing increase in mental disorder in many countries. She showed charts to illustrate the increase in this country from 1859 to 1913, and the fact that the increase was chiefly among pauper lunatics. She thought the eugenist should be linked up in the team and that the time would be ripe for a real consideration of sterilisation at their next meeting. The eugenists did not aim at the production of supermen, but rather wished to eliminate the non-adaptables, who could not afford to live dangerously.

Dr. G. MOULD (physician, mental diseases, Royal Hospital, Sheffield) spoke from 30 years' experience of a mental clinic at a general hospital of the value of such clinics.

Dr. A. GURNEY YATES (Sheffield) said the time was ripe for dealing with early cases by an organised scheme. The Royal Infirmary had just started a mental clinic. In the treatment of early cases they would be able to study causation.

Prof. W. H. FROST (Johns Hopkins University, U.S.A.) was much impressed with the fact that two sessions had been devoted to mental hygiene and that every speaker had made concrete proposals.

Councillor WILLIAMS (Sheffield) said we must have mental hospitals for mental breakdowns free from any slur or stigma. Other speakers dwelt on the bad effect of unemployment and a hopeless outlook, and that the public must be educated in the need for and use of mental hospitals.

Dr. MAPOTHER, in reply to a question as to the increase in mental disorders, pointed out that it was difficult to make a fair comparison with former years because the standards for discharge were now higher and the death-rate among the patients was lower.

LOCAL GOVERNMENT ACT, 1929.

Dr. J. J. BUCHAN (M.O.H., Bradford), in his presidential address to the Conference of Medical Officers of Health, which met on July 18th, dealt with the care of the sick under this new Act. He pointed out that Section 5, which exhorted councils to a certain course of action, was at present permissive in character. It enabled a council to declare in its scheme under the Act that any medical assistance shall not be of the nature of poor relief, but shall be provided under the Public Health Act of 1875. The mere change of ownership of hospitals from guardians to councils was of no moment, unless accompanied by detailed changes in working. Even the best poor-law infirmaries were seldom quite free from remnants of the old deterrent principle. Admission to the new hospitals must be made easy for persons that needed hospital treatment. The recovery of expenses must not be made in such a way as to deter sick persons from seeking hospital treatment. Hospital provision was an exceedingly onerous duty, and they must get what help they could from voluntary bodies.

Dr. W. ALLEN DALEY (M.O.H., Hull) detailed the advantages which would accrue to the maternity and child welfare and school medical services if the Act were properly worked. He referred to the "penal" clause, Section 104, which enabled the Minister to reduce the grant payable to any authority if satisfied that such authority had failed to achieve a reasonable standard of efficiency, and also gave a statutory right to voluntary bodies to make representations to the Minister if services in their area appeared to be neglected. Grants which had formerly been made direct to voluntary associations would now be made through the local authorities. In the case of rescue homes it was properly thought desirable to remove an unmarried expectant mother to a distance from her old surroundings. Such rescue homes should not lose their grant because they catered for persons from another district. The health committees ought to become the new public assistance committees. The health committees would run all institutions and have much responsibility for the provision of proper dietaries. They would also need to coöperate with the voluntary hospitals and be able to provide good hospital accommodation for tonsils and adenoids. Health visitors, who had hitherto acted as relief officers, without proper liaison with the poor-law officers, would now be relieved of the undesirable duty of making inquiry into the financial circumstances of the people they visited. Such inquiry for assessing relief must now be done scientifically by one body, and one register must be kept for the purpose of all kinds of assistance.

Dr. W. M. ASH (M.O.H., Derbyshire) described a scheme for a complete maternity service within his county which had been already initiated. The scheme made use of existing institutions, and his survey had shown that there were hospitals in existence within five miles of every home. He proposed that, in lieu of building new institutions, additional bed accommodation for maternity cases should be provided at these existing hospitals. The staff of these hospitals would include midwives for intern and extern services and a staff of nurses, separate from the midwives, who would do district work. An ambulance would be provided at each hospital and the services described would be available by use of telephone and motors for domiciliary purposes within a radius of five miles. Home helps would also be sent out from the hospitals when needed, and sterilised outfits. Married midwives and home helps might live near the hospital and not necessarily in it. All antiquated poor-law buildings must be discarded and the new medical services made attractive. They must endeavour to secure the full coöperation of all voluntary institutions and bodies such as the Red Cross.

ABORTION.

Mr. C. J. HAWORTH (coroner for the West Riding) brought to the notice of the medical officers of health the increasing number of procured abortions, followed by illness if not death. Into one hospital in one year from a village with a population of 15,000 some 67 women were admitted suffering from incomplete abortions. None of these died, but, following inquests on some deaths in a neighbouring village, the epidemic of abortions in the first village ceased. It was significant that when there had been a conviction there was a lull of miscarriages in the district where the offence had been committed. Miscarriages in his opinion should be made notifiable. It was the clear duty of any medical practitioner when he was called in to a case of criminal abortion to report the matter to the proper authority.

SYPHILIS IN PREGNANT WOMEN.

Mr. JOHN ADAMS, F.R.C.S., described his experience at Thavies Inn V.D. centre. All the patients admitted are pregnant women affected with syphilis. Mr. Adams quoted from a paper by Sir F. W. Mott in 1912 and from the report of the Royal Commission on Venereal Disease, 1913, to illustrate the disastrous results of antenatal syphilis. The report stated that in the case of untreated syphilitic pregnancies, 50 per cent. of the fœtuses were stillborn, 75 per cent. of the living children died within the first year, mostly in the first week, and most of the remaining 25 per cent. died in early childhood. As a contrast Mr. Adams submitted a table showing the results obtained in all the cases of syphilis treated at Thavies Inn from September, 1917, to June, 1929 :—

Cases treated.	Expected mortality of untreated cases*	Babies born alive. W.R. Pos.	Babies born alive. W.R. Neg.	Actual mortality.	Fœtuses born dead from syphilis.
267	178	86	159	1917–1919..4 / 1928..1 } 5	14

* See Royal Commission, V.D. Report, 1913.
W.R. = Wassermann reaction.

The treatment of the syphilitic mother and of the living child born to her should begin at the earliest possible moment. He often began the treatment of the child within half an hour after birth. If the treatment of syphilitic babies was begun at once and continued for a sufficiently long time they compared favourably with ordinary healthy children. (Mr. Adams showed photographs to illustrate the results obtained.) The procedure usually adopted to obtain blood from babies for the Wassermann test was difficult, dangerous, and often unjustifiable. (Mr. Adams described his method which was quite easy, and showed the special needle with an arrow-shaped point which he used.) Of the syphilitic cases admitted to Thavies Inn from 1917 to 1929, 1 in 12 had gonorrhœa in addition, but the gonococcus was found microscopically in less than 10 per cent. of the patients so suffering. Mr. Adams went on to describe the treatment adopted for gonorrhœa and for the prevention of ophthalmia in the baby. During ten years at his centre there had not been a single case of gonorrhœa ophthalmia. With our knowledge of this power of saving infant life, it was almost criminal that more was not done by the setting aside of institutional

accommodation for these cases, and arranging for teaching to medical students and practitioners the special measures needed.

THE POPULAR LECTURE.

"Many Men, One Aim."

Prof. W. W. JAMESON said that with some justice we spoke of ourselves as pioneers in public health, but that, with our record of past achievements, we were inclined to be just a little complacent, and to give insufficient heed to the doings of other nations. By studying other peoples' methods we should be able either to improve our own, or to feel assured that we were working on the best lines possible. Dr. Jameson went on to give a most interesting account of the work of the public health services in Germany, in Poland, and in the U.S.A., and concluded with a quotation from a speech of Dr. Vincent, the president of the Rockefeller Foundation, describing an ideal internationalism that can hardly be bettered, in which "a generous national rivalry plays an even larger part without weakening true patriotic feeling. To contribute to a common world fund of knowledge, skill, and idealism becomes the ambition of each nation. Patriotism gains a nobler significance."

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE.

THE OPENING OF THE NEW BUILDING.

THE new building of the London School of Hygiene and Tropical Medicine was formally opened on Thursday, July 18th, by H.R.H. the Prince of Wales. The building was fully described in THE LANCET last week (July 20th, p. 149), with illustrations showing the important façades on Gower-street and Keppel-street, and the splendid library, and at the same time the origin of the school, the part played by British workers in its organisation, and the immense debt incurred to the Rockefeller Foundation were recorded.

The proceedings commenced with the reception of the Prince of Wales at the main, or Keppel-street entrance, by Lord Melchett, Chairman of the Board of Management, Sir Holburt Waring, Chairman of the Court of Governors, and Sir Gregory Foster, Vice-Chancellor of the University of London. The Director of the School, Dr. Andrew Balfour, was presented to his Royal Highness, as were the architects of the building, Mr. Morley Horder and Mr. Verner O. Rees, who offered the Prince of Wales the key of the building.

The Address of Welcome.

In the beautiful library a large and representative group of visitors were assembled to hear an address of welcome to the Prince, offered by Lord Melchett. The speaker pointed out that those responsible for the management of the School had embarked upon an enterprise made possible only by the benefaction of the trustees of the Rockefeller Foundation, which had realised that the claims of London as a centre for the teaching of hygiene and tropical medicine were unparalleled, and that assistance to provide the building of a central institute was therefore urgent. Lord Melchett reminded the audience that when three years ago the foundation-stone of the building in which they stood was laid by Mr. Neville Chamberlain, then Minister of Health, the American flag was flying side by side with the Union Jack above their heads, and the same was occurring to-day as a fitting reminder of their debt to American generosity. The absence from the ceremony of any representative of the Rockefeller Foundation was, he said, characteristic of the self-effacing policy of that establishment, while the Ambassador of the United States unfortunately had another engagement which could not be cancelled. Lord Melchett continued:—"The gift of the Foundation followed immediately upon, even if it was not the direct consequence of, the recommendations of a committee which met in 1921 under the presidency of a distinguished relative of your Royal Highness, the Earl of Athlone. The committee found the arrangements for teaching for the Diploma of Public Health in London scattered and inadequate. The great post-graduate teaching centre which the Athlone Committee visualised as a necessity at once became possible by the fact that the trustees of the Rockefeller Foundation offered the munificent gift of $2,000,000 for carrying out the project which the Athlone Committee recommended. In this way it became possible that hygiene and public health should have a university institution of its own. And when further in the course of our deliberations the Seamen's Hospital Society expressed their willingness that the old School of Tropical Medicine should become merged in the institution, we felt indeed that these great twin subjects of hygiene and tropical medicine had at last their long-sought opportunity, and that a new epoch in the history of medicine and related sciences, and in hygiene, was about to be opened. Mr. Chamberlain at the foundation-stone laying, reminded us of the distinguished part which his father, Mr. Joseph Chamberlain, had played in founding, at the instance of Sir Patrick Manson, the School for the study of diseases of the tropics, and it is a pleasure again to recall this fact. We shall continue to be indebted to the Seamen's Hospital Society for clinical and pathological facilities for the study of these diseases, now that we have entered into our new home." The speaker went on to point out that to-day the presence at their gathering of Mr. Chamberlain, the ex-Minister, and Mr. A. Greenwood, the present Minister of Health, was evidence that the School which, in union with the University of London, would be partly maintained by Parliamentary grants, and be open to all nations, would be in a position where party politics played no share, a position that was necessary for the establishment of the laws of health. It was, he concluded, the future duty of the British public and British Government to see that the School was adequately maintained.

The Prince's Speech.

The Prince replied to the address of welcome by formally declaring the building open in the following words:—

"You have right to be proud of the magnificent building in which we are, and if the museums and theatre and laboratories make good the promise of this library, you are to be congratulated upon a building that will be a notable addition to the homes of learning in London. While the part played by America has been described to you, the duty lies on both the British Government and the British people to see that this School is worthily endowed and maintained. The building is a sign that post-graduate education in medicine is about to come into its own. The establishment and endowment of this centre of teaching in preventive medicine is a signal example of the bond between the two great English-speaking races of the world. The chairman has rightly said that there are no territorial frontiers in hygiene. The instruction in the class rooms and laboratories of this building will be conveyed by medical practitioners of every nationality to the far corners of the earth. This research will find its results wherever man lives and moves and has his being.

"Three periods in medical science are stamped definitely, each with its own characteristics. The first, from 1870 to 1900, was a period of sanitary reform. The next period was marked by growing concern for the protection of the individual, which had been the basis of recent legislation, as evidenced by maternity and child welfare, the treatment of tuberculosis and National Health Insurance. We stand now in the early days of an era of preventive medicine in which the progress made in sanitation and care of the individual will be developed, and fresh research will lead to the solution of problems not yet solved and to the prevention of much ill-health. The establishment of this school is of special importance to the British Empire, and it has undertaken great responsibilities. In my travels I have learned personally the appalling loss of life and effort due to tropical diseases,

and I realised the great need for research in tropical medicine and hygiene. In the cause of hygiene generally the school will help and develop the growing work that has already been done. For these reasons I believe that the establishment of this school provides a great opportunity for this country and for the whole world.

"If its work is properly conceived and carried out, there should follow a special development and interest, and a quickening of the public conscience, which will lead to a steady decrease in preventible diseases, suffering and death. By its work in this connection the school will be judged."

The Addresses of Thanks.

A fanfare of trumpets sounded by the Coldstream Guards followed, when an address of thanks was presented by Sir Holburt Waring. Sir Holburt pointed out that throughout the erection of the building, and in every stage of its rise, the notion of a workshop had been kept clearly in view all the time. He said that the London School of Hygiene and Tropical Medicine was intended to be a centre of Imperial effort, and alluded to the pertinent fact that already the Court of Governors, as part of a policy of future development, had taken over from the Government of Southern Rhodesia the research station there. It would, he knew, be the policy of the School to establish a chain of such research stations throughout the Empire as adequate funds were forthcoming, and to send out expeditions from time to time to the tropics. As Chairman of the building committee he recalled that at the conception it had been decided that the first condition laid down for competing architects should be "Let there be Light," and in the employment of half a million sterling real concern he believed and hoped had been shown to make the expenditure wide and judicious. The Director of the School, the professors, and the departmental heads had throughout been consulted in the construction of their laboratories and workshops, and it had not been found necessary, thanks to the generous measure of the Rockefeller gift, to refuse a single request for any piece of essential equipment. He associated the Director, professors, and staff with the governors and the board of management in thanking His Royal Highness for the encouragement and inspiration of his presence.

Sir Gregory Foster, also, in thanking the Prince, said that the new School would rank as a part of the University of the metropolis—the University of the capital city of the Empire—and that its work would be organised, not for London, and not even for the Empire, but for the world. In alluding to the many great men who had been educated at the University of London, and who had gone forth to make the world a better and happier place, he said he would mention one name only, that of Lord Lister, who was a graduate of the University of London, and received his education in London. The Vice-Chancellor described in humorous terms the curiosity that had been aroused in the neighbourhood by the new building, the reason for whose existence the local public had not yet grasped, while he was certain that the new School would increase the tradition of magnificent service in the cause of humanity which the University of London possessed, by sending back students, who had arrived from all parts of the world to be taught, as missionaries of health.

His Royal Highness then visited the museum, the laboratories, and the lecture theatre, and before leaving the building met the workmen employed in its construction who were having their mid-day meal in a tent adjoining the premises. Here the health of the Royal visitor was drunk in beer with musical honours.

A large number of those who were invited to be present at the opening ceremony remained to luncheon as the guests of Lord Melchett, and afterwards, under the supervision of the Director, professors and members of the staff were shown around the building, and were present at cinematograph displays in the lecture theatre.

Rebiews and Notices of Books.

ENZYME ACTIONS AND PROPERTIES.

By ERNST WALDSCHMIDT-LEITZ, Institut für Biochemie, Deutsche Technische Hochschule, Prag. Translated and extended by ROBERT P. WALTON, Department of Organic Chemistry, Columbia University. London: Chapman and Hall, Ltd. New York: John Wiley and Sons, Inc. 1929. Pp. 255. 20*s*.

THERE are many books upon enzymes. Some of them are almost entirely theoretical and physico-chemical; others are laboratory handbooks giving methods for the preparation of active ferments from their natural sources; others are largely catalogues of facts. This volume falls into none of these classes, but sets out to describe enzymes and their actions from a definite point of view—that of the Willstätter school. Prof. E. Waldschmidt-Leitz has played a considerable part in the brilliant series of researches on enzymes carried out during the last ten years by Prof. Willstätter and his associates at Munich, and his book has the value to be found only in the work of one who has himself had practical experience of the problems involved. In order to appraise the book it is necessary to consider in what respects the work of Willstätter differs from that of his predecessors. In the first place, he has set out to place the preparation of enzymes on a quantitative basis, such as is customary in experiments in synthetic organic chemistry, for example, and he has considered in all cases the number of units of enzyme activity recovered after purification as well as the unit-weight of the enzyme preparation. This outlook led to a greatly increased efficiency in the various steps used in purification. Many of the methods employed by Willstätter are based on selective adsorption of the enzyme on to various substances such as alumina and kaolin, and subsequent removal (elution), usually by alteration of the reaction of the medium. Such processes are not new, but in the hands of Willstätter and his colleagues they have led to some remarkable results, such as the separation of enzymes from their closely associated contaminants, from activators, and from other enzymes. Willstätter considers that the enzymes are composed of a colloidal bearer and a specific, active group, which enables them to be bound to the substrate, and the composition of the active group at the same time conditions the colloidal nature of the entire complex. One of the most striking facts which have emerged from Willstätter's researches is that the properties of the enzyme are often profoundly modified by their intensive purification. Thus the conventional view regarding the higher protein fission products as the specific substrate of trypsin, which only hydrolyses these substances in the presence of the activator enterokinase, has received a rude blow from some recent work of this school. Trypsin prepared by adsorptive methods did not attack ordinary peptides when activated by enterokinase; on the other hand, certain basic proteins, such as the protamines and also the products of peptic digestion, are rapidly broken down even by the non-activated enzyme. In other respects the conventional views receive short shrift from Prof. Waldschmidt-Leitz. Most text-books, even quite modern ones, state unequivocally that the gastric proteolytic enzyme is secreted as an inactive zymogen known as pepsinogen or pro-pepsin, which is converted to the active form by the action of the hydrochloric acid in the stomach. This view is based on the observed effect of acid (which may more logically be regarded as a pH effect), and the varying stability to alkali of the active and inactive forms. This variation of stability may, however, be due to different amount of associated substances in the enzyme solutions under comparison. In any case the evidence in favour of a zymogen precursor is very small.

The critical outlook of this excellent book will be clear from these examples. Its contents are well arranged and are divided into a general section, dealing briefly with the history of the subject, with enzymes considered as colloids and as electrolytes, and with the kinetics of enzyme action. The other half of the book deals with the various enzymes individually. Their preparation and properties are well described, again from the Willstätter standpoint.

To those who wish to read in a connected form the conclusions reached by this important body of scientific workers, this work can be strongly recommended. We dissent from the view of the translator that, among others, students of medicine will find the volume of service. In our opinion it is essentially a volume for the research worker, since though its pages show how unwarranted is the dogmatism of the ordinary text-books where enzymes are concerned, much of the teaching would hardly be well received by examiners at the present time.

VIRUS DISEASES.

Les ultravirus et les formes filtrantes des microbes. By Dr. P. HAUDUROY, Préparateur à la Faculté de Médecine de Paris. Paris: Masson et Cie. 1929. Pp. 392. Fr. 40.

THIS monograph, which is the first on the virus diseases to reach us from France, starts badly, but improves as it goes on. The first part consists of a catalogue of the diseases and a summary of the known properties of the filterable viruses to which they are attributed. The information is neither happily selected nor critically presented. This part of the book, in fact, illustrates well the lack of system which has characterised the investigation of the agents of these diseases. The second portion is better compiled, and provides a comparative survey which is well worth reading. The author's views as here presented are on the whole orthodox. A serious defect is the absence of a bibliography. In the third portion of the book more rein is given to the imagination, and a very interesting thesis is developed. It is pointed out that many diseases of this type are definitely associated with certain micro-organisms which in our present stage of knowledge are not believed to be causal but commensual—in the French phrase they are "microbes de sortie." One would instance the almost specific salmonella in hog-cholera, *B. bronchisepticus* in distemper and, perhaps, Pfeiffer's bacillus in influenza. Hauduroy holds, as a corollary to his belief in the existence of filterable forms of the visible bacteria, with which the third part of this volume deals, that these are really the causal organisms of the diseases which are initiated by the filter-passing phase of the microbe's life-history. The belief in such phases for the larger bacteria has obtained little adherence in this country, since it is held that no very convincing evidence of their existence has been produced. However, so long as we remember that the foundations of the edifice erected by Dr. Hauduroy are inadequate for its superstructure, no harm can result from a cautious exploration of its features.

CONJUGAL LIFE.

Ideal Marriage. By TH. H. VAN DE VELDE, M.D. Translated by STELLA BROWN. London: Heinemann (Medical Books) Limited. 1928. Pp. 325. 25*s*.

IN view of the increasing tendency to seek for an elucidation of neurotic disorder in terms of disharmony of the sexual life, a good book by a responsible medical authority, written for medical readers, upon the physical aspects of marriage, should satisfy a need. Dr. Van de Velde has for some years been in charge of the Gynæcological Clinic at Haarlem, and this book has been written as a result of the experience gained in the days of his professional activity. This is the first of a trilogy of books and purports to deal with the sexual basis of married life. The second book of the trilogy will be called "The Prevention of Conjugal Aversion," and the third, "Fertility and Sterility in Marriage." "This first volume," it is stated in a preface, "deals with the physiology of conjugal life, because knowledge is the indispensable basis, both theoretical and practical, for success in marriage"; and its chief value rests in the frank and open way in which it discusses the conduct of marital relations.

It falls short of the ideal book for medical men in this, that whereas its sale is restricted to the medical profession in this country, it was not originally written, in German, for the medical profession alone. This is acknowledged in the preface, wherein it is stated that the book "attempts to help such married couples as have not recourse to doctors, without their intermediary advice." Actually this book has enjoyed a very considerable sale in Germany, where it could at one time be bought on most bookstalls. The result of this circumstance is that it contains some elementary anatomical descriptions that are likely to prove somewhat wearisome to the medical reader. Another drawback is that the style is pitched on a plane of ideality which is somewhat exalted for purely medical purposes. Thus, into the text are intercalated what the author, or the translator, has called three "Intermezzos of Aphorisms." These vary considerably in quality. They range from observations as excellent as "A husband's interest and honour alike enjoin that he should never permit himself a sexual gratification which he has not made his wife's desire as well," to other less edifying pronouncements.

In spite of these not very important defects, however, this book is to be recommended to those medical men who feel that disharmony in marriage is a source of mental stress of disorder to their patients, and who wish to equip themselves to give appropriate advice to remedy this disharmony, without having to read the ponderous volumes that are devoted to the study of sexology.

The Hygiene of Marriage. Second edition. By ISABEL EMSLIE HUTTON, M.D. Same publishers. 1929. Pp. 125. 5*s*.

THE first edition of this book was published in 1923, and an edition was also published in Dutch in 1925. To the practitioner who is asked by his patients for a work by a responsible author setting forth the facts of sexual physiology and psychology, this book is to be recommended. The anatomy and the physiology of the reproductive organs are explained in as much detail as is necessary, and the literary style is both simple and free from criticism. Despite its title, the book deals with the reproductive functions of woman as a whole. There are useful chapters on the onset of menstruation and the menopause which only very indirectly touch upon the question of marriage. Perhaps the most valuable feature of Dr. Hutton's book is that she makes the fullest allowance for the wide variations in sexual needs that occur in different people. Her method is to set forth the problem, and to leave the solution for the couple to reach in accordance with their personal characteristics. There are no generalisations made from religions or sociological preconceptions.

The book could offend no one seriously desiring knowledge and, suitably recommended, is capable of giving valuable help.

THE RHYTHMS OF LIFE.

By D. F. FRASER-HARRIS, M.D., D.Sc. London: George Routledge and Sons, Ltd. 1929. Pp. 185. 5*s*.

CERTAIN of these essays may have already met the eye of the reader, for they have appeared in well-known magazines and newspapers. They deal, in simple language, with such subjects—to select certain for example—as the eye as a camera, the comparative sensitiveness of the sexes, the analysis of tastes—i.e., of the true gustations, our debt to the microscope, and the cause of colour, the other themes being

similarly large in their relation to life, and similarly likely to escape exact comprehension until attention is directed to their problems—scientific or social. The volume makes excellent reading, for in sound but colloquial manner it deals with fundamental questions arising out of physiology, chemistry, and physics. Dogmatism is necessary in order to deliver the messages with appropriate brevity, but on the whole the teaching that the author lays down would find scientific support, although there are places where modern developments of particular branches of science have somewhat altered our views. Such essays as that on the cause of colour and that on the analysis of tastes, as well as the opening chapter which gives a name to the book, have real educative value, supplying information where the imperfectly equipped are perpetually puzzled.

HANDBOOK OF ANÆSTHETICS.

Third edition. By J. STUART ROSS and H. P. FAIRLIE. Edinburgh: E. and S. Livingstone. 1929. With 60 illustrations. Pp. 339. 8*s.* 6*d.*

THIS excellent little book has grown somewhat since its last edition and has now the advantage of Dr. H. P. Fairlie's coöperation. He has added a chapter on ethylene and oxygen and has brought other matters in the book up to date. The character of this work, which stamped it from the first as a really valuable handbook, has not changed. It is distinguished by an enlightened insistence on a proper knowledge of the physiological changes involved as the true basis of competent anæsthetic work, rather than a mere familiarity with a collection of apparatus. At the same time the essentially practical nature of the anæsthetist's activities are not forgotten. There is no small book better calculated to guide an administrator on safe lines.

THE GROWTH OF REASON.

By FRANK LORIMER. London: Kegan Paul, Trench, Trübner and Co., Ltd. 1929. Pp. 213. 10*s.* 6*d.*

THIS is the study of the rôle of verbal activity in the growth of the structure of the human mind, and is the most recent volume in the International Library of Psychology, Philosophy and Scientific Method; it might well be read in connexion with an introduction to child psychology, contributed under the title of the Growth of the Mind, by Prof. Koffka to the same series. Mr. Lorimer, who is lecturer on "social theory" at Wellesley Psychological College, Mass., U.S.A., approaches the problem of the relation of thought and language through a study of verbal activity in children, acknowledging the inspiration derived from Prof. Dewey of Columbia University, while other authorities, whom he mentions by name, he credits with his ability to elucidate various technical and psychological difficulties with accuracy.

After sketching the evolution of thought prior to the employment of active language, the author traces the growth of verbal activity in the life of the child. Vocal activity we know to be a conspicuous feature of the infant's career, but here we have voice under its physiological description of a form of modified breathing acting conspicuously—and nothing more. Sounds can only become words by virtue of a social process, and a valuable section of the book illustrates this process and leads up to the three following sections showing that verbal processes, spoken or silent, supply the dominant system of human intellectual life. This conclusion, says the author, involves three things: (1) The establishment of fixed "symbolic relations" between unitary phonetic patterns and patterns of situation and behaviour (which are lacking in the fluctual relations of the "first words"), so that words may function as *foci* or *substitutes* for organic patterns in the processes of intellectual experimentation; (2) the development of fixed *relations of order* and sequence in the verbal processes themselves (systems of reference and inference in systematic thinking); and (3) the capacity for more and more intricate *correlation* of intellectual processes, including explicit symbolic systems." Mr. Lorimer's expositions are easy to follow, although his plan of work is not, and we have here a valuable book in which the relation of social to organic factors in thought development is traced, the argument being furnished for the general thesis that while animals may live well by instinct, and primitive communities by culture patterns, civilisation can live well only by symbols and logic.

ANTHROPOLOGY AND MODERN LIFE.

By F. BOAS. London: George Allen and Unwin. 1929. Pp. 246. 10*s.*

ANTHROPOLOGY studies groups of human beings in relation to their social setting. Prof. Boas has had a long and distinguished career as an anthropologist and in this book he summarises his views of the relation of his science to our life to-day. He deals with race, nationalism, eugenics, criminology, education, culture, and related topics throughout in an interesting way. As befits the real student, the author is evidently more impressed with the problems which remain to be solved than with what we have found out already, and the reader will be struck with the absence of dogmatism and the open-mindedness of the discussions. He has no quack remedies for our social evils and deficiencies; all we can do, he says, is to watch what we do in the light of what we have learned and shape our steps accordingly.

DISORDERS OF CHILDREN IN INDIA.

Birch's Management and Medical Treatment of Children in India. Seventh edition. By V. B. GREEN-ARMYTAGE, M.D., F.R.C.P., and E. H. VERE HODGE, M.D., M.R.C.P. Calcutta and Simla: Thacker, Spink and Co. 1929. Pp. 482. Rs.10.

THE publication of this edition perpetuates a work, the continuity of which has been maintained for 75 years. Originally written by H. H. Goodeve in 1844, it was remodelled by Brigade-Surgeon Birch about fifty years ago, since when it has been revised from time to time. The present authors have introduced much new material, and have brought the book thoroughly up to date.

The practicability of bringing up European children in India is the first question likely to be considered by those who have to decide whether to spend their married life in that country, and they are likely to seek advice first from their family doctor. It is thus not only medical men practising in India who may want to consult this work, the authors of which give clear information on the possibilities and limitations of family life in India. During the first year of life the child does not suffer injury; even up to the age of 5 or 6 the child's health may be perfectly satisfactory if special precautions are observed; but after this age the climate of the plains conduces to physical and moral degeneration. Children brought up entirely in the hills are in no way inferior to those brought up at home. The book contains short accounts of the disorders of childhood, and is not limited to purely tropical diseases. The chapter on rickets suggests that this disease is not as rare among any section of the Indian community as has sometimes been alleged. Infective bowel complaints are dealt with in some detail, and emphasis is laid on the extreme rarity of amœbic dysentery in children as compared with bacillary infections. The chapter on malaria is a particularly valuable one, the practical details of the treatment and its numerous difficulties being fully discussed. The authors disapprove of the routine use of quinine as a prophylactic.

This is a work for which there is likely to be a large demand, not only among practitioners but among educated Europeans who are faced with the problem of rearing children in India.

THE LANCET.

LONDON: SATURDAY, JULY 27, 1929.

AFRICA AND SCIENCE.

THE ninety-ninth meeting of the British Association for the Advancement of Science began in Cape Town on Monday; the concluding assembly will be held in Johannesburg on August 3rd, after which the members and visitors will disperse to visit some of the wonders of the continent. The whole affair will no doubt be a great success, and we can envy those who have been lucky enough to get there. While we wait their traveller's tales, we can get some idea of the atmosphere in which they are from the prints of the various addresses which are available. Nothing, perhaps, in these is more remarkable than the expression of the feeling that, just as facilities of travel have made a meeting in South Africa an easy possibility, so it has become the proper business of natural science to concern itself directly with humanity and its welfare; politics in the widest sense is now one of its disciplines. In his presidential address on the International Relationship of Minerals, Sir Thomas Holland, as might be expected from so practical a man, goes straight to the point, and shows how the control of mineral products means the control of war and peace as well as industry; it is a new departure to find the President's discourse leading to the conclusion that "the only two nations that can fight for long on their own natural resources are the British Empire and the United States; if they agree in refusing to export mineral products to those countries that infringe the Kellogg Pact, no war can last very long."

Africa is full of the varied problems raised by the intimate contact of advanced and backward peoples—by man's passion for interfering with the order of nature—and it is natural that the Association should pay a good deal of attention to these questions in the sections of anthropology, economics, and elsewhere. Philologists, economists, and cellular cytologists are all involved, and if their combined efforts can do something towards a happy issue, the advantages of such organisations as the British Association, which bring together workers and thinkers of so many different complexions, will be admirably illustrated. To consolidate the humanities of Africa into a coherent and harmonious civilisation will realise in the best way the doctrine of holism set out by General J. C. SMUTS—South African, botanist, philosopher, and statesman. The address of Vice-Chancellor J. H. HOFMEYR, with which the proceedings actually commenced, is perhaps of more local interest. He points out the opportunities which are available in Africa for opening up our knowledge of every branch of human interest. The apparatus and equipment—human and material—for the pursuit of natural knowledge, have been enormously increased since the last visit of the Association in 1905, and curiosity has grown with the chances of satisfying it; from the more narrowly economic as well as the wider scientific points of view, Africa is now at least as useful as any other part of the world. In our own extensive field, our readers will hardly need to be reminded on the one hand of the magnificent institutes for veterinary and medical research and on the other of the contributions which the study of trypanosomiasis, sleeping sickness and other diseases have made to our general knowledge of infections. South Africa is now being Africanised, it is acquiring a culture and outlook of its own, and in many ways it can and will help the rest of the world. Of the more immediately biological addresses, we give an epitome of Prof. W. E. DIXON'S discourse on Physiology the Basis of Treatment on another page; Prof. A. C. SEWARD deals with fossil botany and the correlation of African with more northern strata; in Zoology, Prof. D. M. S. WATSON points out that while the fact of evolution is now believed in more firmly than ever, the mechanism of it seems more and more obscure, and he suggests that it is time to get nearer the basis of adaptation by a more intensive study of comparative physiology. Dr. J. S. HALDANE, General SMUTS, Prof. D'ARCY THOMPSON and others will discuss the Nature of Life, and may or may not succeed in getting nearer to finding out what it is.

GLYCOGEN, INSULIN, AND EPINEPHRINE.

GREAT as is the therapeutic and scientific value of the discovery of insulin it has not as yet simplified the physiology or pathology of diabetes. The cause of metabolic failure in diabetes is still to seek and there are many other problems which have resisted solution in spite of the new knowledge. Insulin has not proved to be a master key, but it has opened many doors and it has closed others by showing how slender is the evidence upon which certain orthodox ideas about carbohydrate metabolism are based.

In the lectures recently delivered by Prof. J. J. R. MACLEOD at the London Hospital, and published in our columns,[1] the results of recent work are set out in some detail. The fate of ingested soluble carbohydrates is of particular interest and some remarkable differences have recently been observed in the rate of absorption of different sugars. When these are given by the mouth absorption occurs very rapidly from the upper level of the small intestine, and according to C. F. and G. T. CORI the amount absorbed per hour per 100 g. of body-weight has a definite value for each sugar. Peritoneal absorption, on the other hand, appears to depend merely on the concentration of the sugar solution. The effect of ingested carbohydrate on the blood-sugar is well known clinically from the use of the glucose tolerance test, and the ingestion of lævulose and galactose has been studied in tests of liver efficiency. The fact that the consumption of these substances has such a slight effect on the sugar content of the blood, if the liver is working efficiently, is assumed to be due to the rapid polymerisation of these sugars to form glycogen by the action of the normal liver. But even the explanation of the presence of glycogen in the liver is still unknown; is it a simple storage of carbohydrate or is it, as CLAUDE BERNARD thought, a type of internal secretion, by which the glycogen is produced in the liver cells from non-carbohydrate sources? It is well known that new formation of glycogen, from protein or fat, or both, occurs in the liver during starvation, but it has generally been thought that the liver glycogen disappears when the fasting animal is made to do muscular work. This result has not been confirmed

[1] THE LANCET, July 6th, 13th, and 20th.

by some recent work discussed by Prof. MACLEOD. It is also questionable whether in pathological conditions glycogen ever disappears completely. The storage hypothesis does not explain the action of epinephrine and insulin on the liver glycogen. Epinephrine causes deposition of glycogen in the fasting animal and the breakdown of glycogen in the liver rich in this substance. The mechanism by which insulin acts is not yet clear, though it is now seven years since its remarkable property of lowering blood-sugar was first used therapeutically with miraculous success. Diabetes has often been attributed to a failure of the organism to oxidise carbohydrate. This is supposed to be shown by the low respiratory quotient, lack of ability to store glycogen in the liver, and excessive new formation of glycogen from non-carbohydrate sources. This view, based mainly on determinations of the dextrose-nitrogen ratio, has not in all respects been confirmed by recent work, and there are objections to some of the arguments brought forward in its favour. There is, moreover, some evidence that the diabetic animal is able to utilise the blood-sugar at approximately the same rate as the normal animal, though perhaps not to oxidise it at the same rate. It is possible that much evidence based on measurement of the respiratory quotient is unsound in view of the over-ventilation of the blood in the lungs in the eviscerated preparations used. I. L. CHAIKOFF and MACLEOD have found that the respiratory quotient following increased muscular activity is the same in normal as in diabetic animals. The total evidence available does not support the view that insulin merely acts by direct stimulation of the oxidation of carbohydrate. Nor is it possible as yet to say what is the fundamental cause of the metabolic failure. One theory is that only the glucose produced in the liver is excreted in diabetes, and that the diabetic muscle is unable to oxidise this glucose, although it can use it for glycogen formation. This is, of course, contrary to the usual view that the diabetic animal derives its energy from the combustion of fat and protein. At present all that is definitely known is that insulin given to diabetics causes glycogen to appear in the liver, whether or not carbohydrate is given to the animal.

In normal persons the muscle glycogen seems to be dependent in some way on the liver, while C. H. BEST, J. P. HOET, and H. P. MARKS have shown that glycogen formation following the addition of glucose to the blood can occur in muscle in the presence of insulin. Insulin is not, however, essential to the process, since glycogen is formed in the muscles of depancreatised animals. Experimental evidence suggests that either glycogen formation in the liver or increased production of insulin from the pancreas may be an essential preliminary to the formation of glycogen in the muscles of normal warm-blooded animals. The breakdown of glycogen in muscle has long been associated with muscular exercise; in a spinal animal the glycogen content falls when the muscle is stimulated. MACLEOD and FRASER, however, have recently shown that in rats working steadily the oxygen requirements of the muscle are adequately met and the glycogen need is sufficiently provided for. Only when the activity is so great that the oxidation of carbohydrate is defective does the glycogen content become appreciably lowered. These are only a few of the problems raised by the conflicting results of experiments devised to test theories of carbohydrate metabolism and to explain or confirm clinical findings. Luckily the impetus given to this study by Prof. MACLEOD, to whom the original researches of BANTING and BEST owe their initiation, shows no sign of slackening and it is unlikely that its force will be spent until the pathology of diabetes is cleared up, even if the exact biochemical changes involved cannot be repeated in the laboratory.

DROUGHT IN THE THAMES VALLEY.

THE effects of a dry summer following a dry winter are beginning to make themselves felt in the Thames Valley, although not to the same extent as in some other parts of England. With the recent memory of floods in the mid-reaches of the Thames it is difficult to visualise the fact that the rainfall of the past few months has been abnormally low, lower in fact than in any year since 1921, when the drought lasted until the end of August, to be succeeded by a gush of water which might have imperilled the public health, although it did not. Very little water is passing over Teddington weir, and the pool below consists practically of the same water which oscillates to and fro with the tide; the whole watershed of the Upper Thames is draining directly into the reservoirs which supply London with water; but even the immense new Littleton basin is not inexhaustible. We are assured that the Metropolitan area is not threatened with any immediate deficiency in supply, and although the Trafalgar Square fountains have stopped playing, as an object-lesson (they do not really use up water), local authorities have hesitated to issue appeals for economy because they feared to create an atmosphere of panic. We have not, in fact, arrived at the time when families must reduce their personal ablutions to a minimum, and use slop water for watering plants and garden, but the time has arrived when every patriotic householder will adopt altruistic principles in relation to public water-supplies, and avoid any unnecessary or luxurious use of tap water. To the majority of Londoners water only becomes attractive at the height of a heat-wave, and the consumption per head went up last week at least 25 per cent. over the average. Some time we must try to reach a tangible conclusion as to what is a reasonable rate of consumption per head of population in summer and winter, for the increased storage could no doubt be provided at a price, although the price might be so colossal that some adjustment of the personal water quota would be the thing to aim at. The way in which water was economised in the summer of 1921 was little short of amazing, and there was no evidence that the health of the community suffered in any way as a result of the drought, though their convenience and sense of well-being may well have been adversely affected by change of habits. Probably the restriction could have been carried much further than it was without serious harm. The violent outpourings of the last week-end should also remind the community of the risks of pollution when the dry period comes to an end, and the surface gathering grounds are subjected to sudden heavy rainfall. The value of chlorination under such circumstances has now been proved up to the hilt; it is far more effective than any possible injunction to the public to boil water when there

[1] Metropolitan Water Board. Twenty-third Annual Report on the Results of the Chemical and Bacteriological Examination of the London Waters for the twelve months ended 31st Dec., 1928. By Sir Alexander Houston, Director of Water Examination. London: P. S. King and Son. 21s.

should be a doubt about its purity, an injunction which is sure to be unobserved just where the necessity is greatest.

Compared with many rivers of the Continent of Europe, to say nothing of such streams as the Nile or the Amazon, the Thames may be an inconsiderable stream, but Sir Alexander Houston[1] tells us that in its course from Staines to Hampton the Metropolitan Water Board abstracts 152 million gallons of water a day, or, to put it in pictorial form, more than enough water to supply at 35 gallons per head daily the needs of Bradford, Birmingham, Glasgow, Liverpool, Manchester, and Sheffield. River water, unfortunately, has to be filtered and disinfected, but it is gratifying to know that the two million people who have been supplied with chlorinated Thames water since May, 1916, have not complained about the taste of it. Treatment with liquid chlorine of the water on its way from the Staines reservoirs to Sunbury, instead of the old plan of adding bleaching powder at Staines itself, has not only been effective in eliminating the colon bacillus, but has been economical in practice, since it increases the volume of water which can be passed through a filter before it has to be cleaned out. It may be remarked in passing that it costs £40 to clean an acre of filter-bed. But although chlorine has thus come to be accepted by the London water drinker, there have been flavours and colours in the water which have troubled the Water Board. Several years ago the water from the Barnes works acquired a taste euphoniously described in the laboratories as "geranium-like," but more pointedly by the consumers as resembling rotten fish or castor oil. This taste was completely removed by the addition of 2½ to 5 pounds of potassium permanganate to every million gallons of water, the faintly pink tinge of the water soon disappearing, leaving behind only a slight brownish discoloration. The malefactor in this case was the troublesome but harmless tabellaria. A few years previously another harmless growth, oscillaria, developed to such an extent in the filter-beds that they looked as though they had been fouled with green paint; in this case a small dose of copper sulphate proved sufficient to eliminate the mischief.

Chlorination has not, it appears, been such a success in the other sources of London water. In the New River the colon bacillus, after its apparent removal at Crouch End, has reappeared by the time the water leaves the Stoke Newington reservoir and the cause of its reappearance is not yet clear. Of bacterial contamination the presence or absence of the typhoid bacillus is of the first importance, and it is reassuring to find from a long series of experiments with the glucose-bismuth-sulphite-iron medium described by Wilson and Blair, and later by Prof. Wilson at the Public Health Congress in 1928, that Sir Alexander Houston is convinced not only of the value of the medium, but of the practical absence of this organism in 100 c.cm. of raw river water, and by inference in one thousand times that amount of purified water.

THE KING.

IT is satisfactory to learn that during the week following his operation on July 15th the King has made steady progress. The fact that purulent discharge from the abscess has already ceased shows that the measures taken to promote drainage were fully justified and have achieved speedy success. The inconvenience and discomfort of the first few days following any operation are not negligible, but the fact that the King was allowed to sit up for a short period as early as last Monday, and for some hours on Tuesday, shows how little his general health has been disturbed. We are entitled to hope that his complete recovery is now only a matter of time, and that no further interference will be required.

Annotations.

"Ne quid nimis."

THE ROCKEFELLER FOUNDATION: A NEW CHAPTER.

IN 1909 the Rockefeller Sanitary Commission was established for the control of hookworm disease in the United States, and in 1913 the Rockefeller Foundation came into existence, taking over the Sanitary Commission. After 16 years of intense activity entailing the total expenditure of over 144 million dollars the Foundation has opened a new chapter by certain steps of extension and reorganisation.

These changes are recorded in a review for 1928 by the President of the Foundation, George E. Vincent. He describes how during 1928 a conference committee of four Rockefeller boards—the General Education Board, the Rockefeller Foundation, the Laura Spelman Rockefeller Memorial, and the International Education Board—sought ways of bringing the work of these organisations into close and more definitely coöperative relations. In the autumn the committee made a report embodying recommendations which were approved by all the groups, with the understanding that the new régime would take effect at the beginning of 1929. Among the essential features of the reorganisation is the merging of the Laura Spelman Rockefeller Memorial into the Rockefeller Foundation, which will begin as a new corporation. This new Foundation will extend its activities to include not only public health, but the advancement of knowledge in the medical sciences, in the natural sciences (taking over the foreign programme of the International Education Board), in the social sciences (previously administered by the Memorial), and in the humanities. The public health activities will be administered in future through an International Health Division with a group of seven scientific directors and a China Medical Board is to be incorporated, with independent trustees, to which the lands and buildings in Pekin, together with endowment funds and annual appropriations, will be given. The details of this vast amalgamation and reorganisation of resources appear to be fully worked out, and if it is possible to imagine a further extension of the activities of the Rockefeller Foundation such an extension should now take place. To anyone unacquainted with the work done by the Foundation under the glorious motto of "The well-being of mankind throughout the world" a study of the review for 1928 will be illuminating. In one almost breathless sentence in which a full-stop does not occur for nearly two pages, it is announced quite bluntly that the Foundation in 1928 expended over 21 million dollars on some 20 different forms of activity. Each of the 20 headings covers large areas of country and large pieces of work.

A sample of the methods and policy adopted is given in a description of the Lyon Medical Centre. At Lyon the municipal authorities have under construction a large new hospital; the Foundation was asked to coöperate in providing an adequate medical centre for education and research. The first step was to invite the dean with two of his staff and the university architect to visit medical centres in various countries as guests of the Foundation. The commission returned to Lyon, worked out a plan, and as a result of this a medical school building is being erected immediately across the street from the new hospital, while the project also includes an increase in the annual budget to improve teaching facilities and the provision in the hospital of laboratories for the clinical subjects. Towards the cost of this project, to which the Government, the municipality, the university, and private citizens contribute, the Rockefeller Foundation has appropriated or pledged 43 million francs.

HEALTH INSURANCE IN THE IRISH FREE STATE.

THE text of the National Health Insurance Bill recently introduced to the Dail was published last week. The only proposal of any importance in the Bill, writes our Dublin correspondent, is that to abolish county insurance committees and to transfer their functions to the county councils, which will be provided with funds to enable them to perform their increased duties. Certain other proposals tend to simplify the working of the Insurance Acts and to lessen the expense of their administration. The deposit contributors' fund is to be abolished, and members of this fund are to join approved societies within a specified period. The difficulties which have hitherto existed regarding insurable married women are surmounted by giving an insured female a marriage benefit, and providing that if she desires to work after marriage she will be treated as if she had never been insured. The Bill appears to be based on the recommendations of the Committee of Inquiry on National Health Insurance and the Medical Services, but it only touches on a few of the less important of the reforms suggested by that Committee.

AURAL DISEASE AND BATHING.

THE holiday season, which has now arrived, will doubtless be accompanied as usual by trouble—some minor and some serious, in the ears of bathers. Mammals such as the seal, which have reverted to an aquatic life, have a mechanism for closing the auditory meatus, and in some cases the nostrils also, when submerged; but man is not an aquatic animal and does not possess this form of protection. Water can reach the ear and cause damage to it either by way of the external auditory meatus or through the Eustachian tube. When water gets into the external ear it produces a disagreeable sensation, as every swimmer knows, but it runs out again quickly and does no harm in a healthy meatus. If, however, the ear contains much cerumen this imbibes the water, swells up, and blocks the canal. The sensation of "water in the ear," persisting long enough for advice to be sought, is nearly always due to wax, and can be cured by its removal. People with a tendency to excessive secretion of cerumen should have it removed before going to the seaside. This retention of moisture from the presence of wax readily sets up a dermatitis, and is the usual cause of external otitis in bathers, but apart from this people with a tendency to eczema of the meatus are apt to suffer an exacerbation of their trouble from bathing. Unskilful diving may rupture the drum by compression of the air in the canal, but in general the occasional entry of water into the meatus is harmless, as is evident from the comparative rarity of trouble among innumerable bathers. The most important cause of serious ear disease resulting from bathing is the entrance of water into an old, often quiescent, perforation of the drum; this event is liable to cause a very severe suppurative otitis with all its attendant complications. Patients with a perforated drum should never bathe without a really efficient means of preventing the entry of water into the ear. Ordinary cotton-wool is useless for the purpose, and, by giving a false sense of security, becomes a danger; to occlude the meatus a cast of the patient's concha specially made for each case can be obtained from instrument makers, but a plugging material made of a mixture of wool-fibre and plasticine or wax is very satisfactory and is sold by various chemists; a rubber bathing cap to cover the ears should be worn over any plug. Patients with a tendency to aural eczema may with advantage put in at night a few drops of mercuric nitrate ointment, 1 drm. to 1 oz. of equal parts of olive oil and liquid paraffin.

Nevertheless, people with perfectly healthy ears may develop acute otitis media after bathing, and this is caused by the entrance of water into the tympanum through the Eustachian tube. This entrance is favoured by swallowing while under water and, especially, by violent blowing of the nose, while the passages are full of water. It is when virulent micro-organisms are carried into the tympanum with the water that otitis ensues; these organisms may be present in the water, and it is obvious that the water of swimming pools and public baths is more likely to be heavily infected than that of rivers and the open sea. Much care has been devoted to the purification of the water of bathing places, but more attention has been paid, as evidence of contamination, to the intestinal flora of the *Bacillus coli* group, than to the pyogenic organisms which more frequently attack the ears; but it is probable that the swimming bath may play an important part in the spread of streptococcal infections when, for instance in a school, such diseases as tonsillitis or rhinitis are prevalent. Groups of cases, or small epidemics, of infection of the nasal sinuses have occurred under similar circumstances, and probably from the same causation. But micro-organisms can be carried with the water into the ear even when the water of the bathing place is perfectly clean; this occurs when the organisms are already present in the patient's own nose or throat, and is liable to result from bathing during an attack of sore-throat or coryza.

To sum up: Harmful results from bathing are very rare in proportion to the number of bathers; it is necessary to plug the ears only when there is an open perforation of the drum or when the canal is readily irritated by the water; ear complications are unlikely to occur from infection through the Eustachian tube if the bather refrains from swallowing while in the water and particularly from blowing the nose on emerging, and does not bathe at all while suffering from an active cold or sore-throat.

THE PROGRESS OF INDUSTRIAL PHARMACY.

IT would be hard to exaggerate the debt which modern medicine owes to the firms who manufacture the drugs and other preparations nowadays necessary for its practice. A century ago most clinicians and experimenters had to mix their own medicines and solutions; nowadays they can draw upon an arsenal of products compounded with the utmost care and standardised with extreme accuracy. If the activities of manufacturing pharmacists could be taken as a measure of the advance of medical science in modern times, that advance can hardly have been surpassed by any other branch of human activity. The annual special issue of the *Chemist and Druggist*[1] aims at providing a survey of the industry from all its aspects year by year, and should not be missed by anyone with a sense of the importance of this great auxiliary. Great pains have been taken with the reproduction of the many unique photographs. The chief articles in the industry of to-day deal with the manufacture of cotton-wool and lint at the mills of Messrs. Vernon and Co.; solid spirituous preparations, and the cultivation and preparation of the soya bean, a seed of ever-increasing value as a source of vegetable oil, and as a foodstuff. The issue also contains three first-class historical essays. Dr. Charles Singer contributes the second part of his "Sketches in the History of English Medicine," in which he describes the Anglo-Norman Period and the advent of the learning of Salerno and the Arabs. This is illustrated with a large number of excellent contemporary pictures, including two splendid coloured plates. He gives an interesting quotation from the Prologue to Chaucer's Canterbury Tales; one which perhaps marks the first mention in English of the manufacturing pharmacist: "Ful ready had he his apothecaries to send him drug and his electuaries." Another article describes the pharmacological history of Dublin, where this year's British Pharmaceutical Conference was held, and the history of druggists' weights and measures throug

[1] 42, Cannon-street, London, E.C. 2*s*. 6*d*.

the ages is set out in an encyclopædic contribution illustrated with 84 photographs. Dr. Giovanni Carbonelli, of the National Medico-Pharmacological Institute in Rome, describes and illustrates the private pharmacy of Pope Alexander VII. The Editors are to be congratulated on an admirable production.

AN INDEX OF RENAL EFFICIENCY.

IT has long been recognised that in certain types of advanced renal disease the ability of the kidney to excrete inorganic phosphates is impaired. In such cases the fall in phosphate excretion is accompanied by a corresponding increase in the concentration of phosphate in the blood and more than one attempt has been made to devise a criterion of renal efficiency based on the rate of elimination of injected phosphates. Working with dogs, Bolliger[1] has given intravenous injections of sodium phosphate solutions, of varying pH, and has found that the normal animal is able to excrete from 80 to 100 per cent. of the amount injected within two hours. After destruction of the major portion of the renal tissue, by exposing one kidney to X rays and ligaturing the opposite ureter, the excretion falls as low as 21 per cent. These results with dogs support the conclusions of R. T. Brain and H. D. Kay,[2] who have used intravenous injections of sodium glycerophosphate as an index of renal efficiency in human nephritis and claim that this test gives more valuable information than either the urea concentration or the phenol sulphonphthalein methods. Sodium glycerophosphate has the advantage over sodium phosphate of greater solubility and does not require adjustment of the pH. Since the acidosis which so often accompanies uræmia has been ascribed to the retention of acid phosphate, the wisdom of injecting phosphate solutions in nephritis may be called into question. Brain and Kay, however, find no ill-effects from glycerophosphate, while Bolliger finds that repeated injections of inorganic phosphate actually have a consistently beneficial effect in "nephritic" dogs, and suggests that similar injections may be of value in human nephritis. An adequate explanation of this anomaly is at present lacking, but Haldane, Wigglesworth and Woodrow have shown that large quantities of phosphate buffers help the kidney to excrete acids. It seems that the prevalent view, that phosphate injections are harmful in nephritis, must be revised and, if clinical trial bears out Bolliger's experimental results, we may find a new therapeutic weapon to delay the progress of nephritis.

THE LEPROUS REACTION.

THE acute phase of leprosy has been the particular study of Dr. Richard Green, who has been in charge of the inmates of the Federal Leper Settlement at Kuala Lumpur, in the Federated Malay States, during the last three years. In a paper communicated to the Royal Society of Tropical Medicine and Hygiene, and published in their transactions (1929, xxii., 367), he notes his conclusions. He finds that the leprous reaction, especially in the so-called second stage of Muir, leads to rapid progress of the disease; rarely, the reaction may be of such severity as to lead to death. This acute phase of the disease may recur from time to time in both treated and untreated cases; it appears, however, to be more frequent in patients undergoing treatment with the oils of hydnocarpus and their derivatives. During the past three years about 20 per cent. of the patients undergoing treatment in Kuala Lumpur have had one or more reactions. The Kuala Lumpur Chinese leper patients appear to know and to fear the occurrence of the reaction. Their recognition of the phase is suggested by their native term for it, which means "the rising up of leprosy." Dr. Green has initiated experiments with intradermal tests, using *B. leprœ* obtained from freshly ground nodules under aseptic conditions, which appear to indicate the presence of specific sensitiveness of the tissues towards *B. leprœ* in cases suffering from leprous lesions, with an absence of this phenomenon in quiescent cases. The evidence collected in the course of his investigations seems to show that the leprous reaction may have its origin as an acquired condition of allergy towards *B. leprœ* in the tissues. This supposition appears to be strengthened by observations on the action of adrenalin, on the analogy of desensitatision in serum sickness and other allergic conditions. The continued administration of ephedrine seems to have little effect on newly formed skin lesions, though a number of patients complaining of nerve pains were given single doses of ephedrine hydrochloride gr. 1, with relief lasting twenty-four hours or more. In the absence of a specific for leprosy, any drug securing relief of pain, even for a short spell, is welcome, but continuous search is being made for one which will give a more prolonged spell of amnesia.

[1] Med. Jour. of Australia, May 18th, p. 650.
[2] Quart. Jour. Med., 1929, p. 203.

IN DEFENCE OF THE R.M.O.

THE lively attack upon the habits, manners, and accomplishments of the resident medical officer, markedly in the special and medium-sized general hospitals, which appears over the signature of "Juno" in the current issue of the *Hospital Gazette* would be more wounding if it was plausibly true to life, while the suggestion that the average house surgeon is discourteous and inconsiderate to the extent that the reputation of the institution he serves is liable to suffer is simply fantastic. The article will, however, have served a useful purpose if it leads to a more sympathetic study of the problem of the young resident. The house surgeon—we include under the term any resident in the institution—by his training, his contact with suffering and the intimate human problems of sickness is usually years in advance of his peers in other realms of activity. In the early twenties he is called upon to shoulder responsibilities and make vital decisions, the parallel of which it is difficult to find in other walks of life. Indeed they are only to be discovered in such callings as that of the young airman pilot, but here the judgments needed are those of rapidity of thought and action, the quick estimate of distance and movement; they are not the decisions which come from long mental deliberation, and the careful sifting of evidence, the true province of the mature intellect. Yet this is what we call upon our youthful house surgeons to do, and any unbiased critic must admit that they acquit themselves with credit. In any body of men there must of necessity be some who lack the tact which is required in dealing with sick persons and their distracted relatives, whose sense of values is often disturbed by the strain to which they are subjected. Yet the average house surgeon realises their disability, and adjusts his conduct to it in a manner which often fills his elders with admiration. "Juno's" criticism reflects not so much indeed upon the character of the average house surgeon as upon the election committee of the institution which is so unhappy in its choice among the ranks of applicants. She complains of trouble that has arisen through negligence or lack of knowledge of the legal responsibilities of a house surgeon, instancing the notification of infections diseases and other aspects of medical law, and advocates a test of knowledge in regard to these matters before appointment. Now every doctor receives such instruction before qualification, but it would be simple for any institution to call the attention of its officers, say by a small printed pamphlet, to legal obligations, the neglect of which is liable to cause unnecessary work and perhaps friction with the local authorities. Liberality in thought and action is a natural and desirable attribute of youth, but waste would

undoubtedly be diminished by soliciting the collaboration of hospital residents who do not, we feel sure, suffer from the instinctive lack of sympathy and the unhelpful attitude to the general working of the institution with which they are credited. No body of young men work under such circumstances of stress and strain, night and day, for very meagre immediate (or financial) reward, with such loyalty and devotion and efficiency as do the residents of a hospital. Owing to economic factors, and the voluntary system, much of the most responsible and onerous work of hospitals is carried out by newly qualified men and women on the threshold of life. Some of it could be done more tactfully, no doubt, by men of long experience and mature judgment, but such labour costs money, which hospital boards refuse to pay. They now get much of their skilled work done at an absurdly low cost, by an army of young and enthusiastic men, who are learning to add to the knowledge acquired in their academic career the wisdom accumulated through daily contact with sick people, their relatives and attendants. This is the system which, as Mr. Percival Mills pointed out recently,[1] results in the general practitioner being the all-round man he is. It is typically British to give the house surgeon a degree of responsibility which, in a foreign clinic, would only be held by a man of many years' experience. In general, as Mr. Mills said, he responds to this trust extremely well.

THE MEDICAL PROFESSION AND THE MINISTER OF HEALTH.

THE Minister of Health, Mr. Arthur Greenwood, informs us that he proposes to enlarge the very wide range of the various forms of consultation which already subsist between the Minister and the medical profession. This extension of contact between the Government and medical opinion takes shape in the appointment, in a purely personal capacity, of Sir John Rose Bradford, Lord Moynihan of Leeds, Lord Dawson of Penn, and Dr. H. B. Brackenbury, as a small informal committee to confer from time to time with Sir George Newman, the Chief Medical Officer of the Ministry of Health. The object of the conferences will be to give ample opportunity for the committee to place before the Minister their views on any current medical matters about which they desire him to be specially informed, and for the Minister to consult the committee with the same ease.

Mr. Greenwood hopes to find in this arrangement a ready means of communication between the committee and himself as occasion arises, believing that it will contribute to the close, continuous, and sympathetic association which he desires to see maintained between the medical profession and the Minister.

THE LEGAL ASPECTS OF MEDICINE AND DENTISTRY.

A THESIS approved for the degree of doctor of laws in the University of London, recently published in book form,[2] combines considerable research into ancient history with a clear account of the statutes and case law, including the most recent decisions affecting the practice of medicine, dentistry, and veterinary surgery. Treating three cognate professions comparatively, Mr. Bullock is able to underline the differences in the latitude allowed by each to the unqualified practitioner. He does not hesitate to criticise the law which, while conferring a professional monopoly on the registered dental surgeon, allows any unqualified person to treat cancer, epilepsy, or paralysis, among other things. Considering the defects of the Medical Acts, he notices the weakness of the General Medical Council's control over the prospective medical student's preliminary educational tests and over the examining bodies' medical examinations; the Council maintains a register of medical students but cannot compel registration. The conflicting decisions under Section 40 of the Act of 1858 (recently invoked in the proceedings against Lieut.-Colonel Kynaston) are discussed, and a chapter on the law of professional negligence ends in an excellent exposition of the unprotected state of medical practitioners called upon to examine patients under the Lunacy Act machinery. Mr. Bullock is not concerned to deal specially with professional etiquette or to advise upon the day-to-day difficulties encountered by general practitioners. He has approached the subject rather from the legal side, to which his thesis provides a sound and faithful guide.

[1] Queen's Hospital Gazette, February, 1929.

[2] The Law relating to Medical, Dental and Veterinary Practice. By Fred Bullock, LL.D. London: Baillière, Tindall and Cox. 1929. Pp. 317. 12s. 6d.

ÆTIOLOGY OF WHOOPING-COUGH.

THE article by Dr. Sugare and Prof. McLeod which appears on p. 165 of our present issue is a timely reminder how little we know of the causative agent of a prevalent and often devastating disease. Since Bordet and Gengou announced the discovery of *Bacillus pertussis* in 1906, opinion has fluctuated about the exact identity of the organism and its precise relationship to the disease. The actual association with whooping-cough was demonstrated by its discoverers, but subsequent workers have been unable to confirm this, neither have serological studies been of assistance, except, perhaps, to throw doubt on the view that *B. pertussis* is the incitant of whooping-cough. Prof. Bordet's contention is, we understand, that the failure of other workers to confirm his work depends on their not using the correct medium, and that if they were to do so the isolation of *B. pertussis* would present no difficulties. This view is now confirmed by the work done in the Leeds laboratory, in which the bacillus of Bordet and Gengou was isolated in 12 out of 21 cases. Moreover, Sugare and McLeod are able to show that *B. pertussis* is culturally different from *B. influenzæ*, can survive cold much longer, and gives a strong oxidase reaction. Interesting and instructive as these results are it remains to be proved that there is more than an association between this organism and the disease; and there is much to be done before Bordet's views can be accepted. Recent work at M.A.B. hospitals in London has shown a very small percentage of *B. pertussis*, and has failed to show any serological relationship of the organism to the disease. In France, however, Debré, Marie, and Prétet[1] have obtained cultures of *B. pertussis* by exposing plates of Bordet-Gengou medium, made with defibrinated horse blood, in front of the mouth of a patient towards the end of a paroxysm of coughing, and appear to have had no difficulty in isolating the organism after two to three days incubation at 37° C. It was shown by Krumwiede, Mishulow, and Oldenbush in 1923 that there were two types of the organism; serum made from type "B" only slightly agglutinated type "A," whereas type "A" serum agglutinated both organisms equally well. But Debré and his colleagues failed to find any type "A" organisms amongst their strains, whereas all their cultures of *B. pertussis* were agglutinated by type "B" serum. These results show that in Paris at least the strains of the Bordet-Gengou organism isolated from actual cases of whooping-cough were homologous. Leaving open the question of the exact role of *B. pertussis* in whooping-cough, we gather from the work here cited that (1) *B. pertussis* is found in a good proportion of whooping-cough cases; (2) that this organism is distinguishable biologically from *B. influenzæ*; (3) that in Paris all strains isolated were homologous. These results, if meagre, should help to clarify our knowledge of the ætiology of whooping-cough.

[1] Debré, R., Marie, J., and Prétet, H.: Annales de Méd., 1929, xxv., 434.

THE LONDON LOCK HOSPITAL.

A QUESTION asked in the House of Commons on July 22nd elicited the definite statement that the Minister of Health does not propose to publish the reports of the committee of inquiry into the management, administration, and staffing at the London Lock Hospital. The public is asked to be content with the assurance that the drastic revision of the laws and rules of the institution which, according to the Majority Report signed by Sir John Eldon Bankes and Dr. John Fawcett, is imperatively needed, is being made. The new laws passed by the govenors of the hospital on June 6th are not set out in detail in the letter to the Minister of Health from the Board of Management of the hospital, which is included in the incomplete documents now presented to Parliament.[1] The essential administrative changes made appear to be the inclusion of a number of women (amounting to one-third) on an enlarged Board, and the appointment of House and Finance committees with definite duties. The House committee will be responsible for the general supervision of the institution and for constant and regular visitation. The position of women acting on the honorary staff is to be officially recognised, the duties of the registrars defined, and the matron is to have a proper status and free access to the Board. The recommendation that each ward should have a fully trained sister in charge, to be relieved when off duty by a fully trained staff nurse, is met by the statement that each *floor* has a fully trained sister in charge, but that though the Board has tried continuously during the last few months to obtain the services of fully trained nurses, it has not yet been possible to fill all the posts. Meanwhile, the salaries of the nursing staff have been augmented by 10 per cent. and the hours off duty increased. The recommendations in the Minority Report, signed by Mrs. H. J. Tennant, suggest strongly that the amenities hitherto offered to patients in the way of privacy, accommodation, and washing facilities are inadequate for modern requirements. Mrs. Tennant expresses the hope that the adoption of her proposals, which are quite explicit, would entitle the hospital again to be recognised by the London County Council and the Ministry of Health. It will be remembered that the L.C.C. grant to the hospital ceased on March 31st, 1928, so that whereas in 1926 the hospital received the sum of £12,000 from this source, and in 1927 the sum of £10,000, in 1928 the grant was only £2300, and this year so far has been nil. The restoration of the grant would do much towards the re-establishment of public confidence, but the publication in full of both reports would, in our view, do even more. Mr. Neville Chamberlain held (see THE LANCET, 1929, i., 953) that the stipulation of the Board for a *private* inquiry would in any case preclude publication of the evidence taken; but even this difficulty could be surmounted by the goodwill of all parties concerned. Names of individuals mentioned could be withheld, if this were considered desirable. Since vigorous action has been taken to remedy many of the defects in administration which have been disclosed, the decision to withhold the full story need not be criticised on grounds of public policy. But a voluntary hospital, competing with other institutions for support from the charitable public, can only succeed against its rival claimants if enthusiasm can be kindled by reports of the work it is doing and the way it is doing it. Such enthusiasm is not damped by frank exposure of old-fashioned or inadequate organisation, but it is incompatible with a state of uncertainty of the degree to which an institution has been found wanting. The shadow of distrust cast by reflections on internal and domestic management is not cleared by assertions that reforms are being instituted. But in our view distrust would not long survive the publication in full of the reasons which moved the Board of Management to demand an inquiry and of the evidence on which the reports of an impartial committee were based, especially as the documents already available give ample guarantee of the zeal with which a complete reorganisation is being pursued.

[1] Papers as to the Administration of the London Lock Hospital and Home. London: H.M. Stationery Office, 1929. Cmd. 3363. 3*d*.

FROM a field of 150 applicants Dr. J. A. Brincker, Dr. W. Brander, and Dr. W. A. Daley have been chosen to fill the three posts of principal medical officer of the divisions in which the public health department of the London County Council is being organised. Dr. Brincker, who will take charge of the division concerned with infectious diseases, is promoted after many years' service in the department. Dr. Brander, formerly medical superintendent of the hospital belonging to the Hackney Guardians, will take charge of poor-law medical administration, while Dr. Allen Daley, medical officer of health and school medical officer of Kingston-upon-Hull, comes south to take over general public health administration, including housing and school medical service. Ninety-three candidates applied for the post of matron-in-chief to supervise the nursing staff at the hospitals transferred to the Council. From these Miss D. E. Bannon, formerly matron of St. Mary's Hospital, Paddington, has been selected.

Public Health Services.

DEATHS FOLLOWING VACCINATION.

AT the resumed inquest at Stepney on a girl of five, who died on July 11th, it was stated by the medical officer of Mile End Hospital that the child was convalescing from pneumonia when, two days before the time appointed for discharge, another child in the same ward came out with a small-pox rash and all the contacts were vaccinated, so far as the parents' consent could be obtained. Vaccination was done with Government lymph on June 25th; on July 9th the child's temperature rose to 100° F., after being very excitable on the previous evening; drowsiness and headache followed, with increasing stupor ending fatally on the 11th. One other child was vaccinated with the same lymph. Dr. D. L. Thomas, medical officer of health for Stepney, said that this was the first case of encephalitis following vaccination reported in the borough. During the present year 285 cases of small-pox had been reported with two deaths, and 10,000 vaccinations had been done by public vaccinators. Mr. R. L. Guthrie, the Coroner, recorded a verdict of death by misadventure, adding that there was a certain risk from vaccination which doctors did not recognise until recently.

A boy of 12, whose father had objected to his vaccination in infancy, was vaccinated on July 3rd, since this was a condition of his participation in a holiday. His arm was in a satisfactory condition when examined a week later. On July 17th he became drowsy; he was taken to Poplar Hospital on July 18th and did not recover consciousness before he died. The inquest opened by the East London coroner on July 22nd was adjourned until July 26th for further medical evidence.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED JULY 13TH, 1929.

Notifications.—The following cases of infectious diseases were notified during the week:—Small-pox 115 (last week 153); scarlet fever, 1971; diphtheria, 1012; enteric fever, 58; pneumonia, 942; puerperal fever, 40; puerperal pyrexia, 80; cerebro-spinal fever, 13; acute poliomyelitis, 8; acute polio-encephalitis, 2; encephalitis lethargica, 20; dysentery, 16; ophthalmia neonatorum, 145. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the Metropolitan Asylums Board on July 16th–17th was as follows:—Small-pox, 198 under treatment, 11 under observation (last week 209 and 6 respectively); scarlet fever, 1364; diphtheria, 1652; enteric fever, 10; measles, 261; whooping-cough, 410; puerperal fever, 29 (plus 11 babies); encephalitis lethargica, 125; "other diseases," 30. At St. Margaret's Hospital there were 18 babies (plus 11 mothers) with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns, including London, there were 2 deaths from small-pox, 1 (0) from enteric fever, 37 (6) from measles, 4 (2) from scarlet fever, 27 (7) from whooping-cough, 22 (8) from diphtheria, 32 (8) from diarrhœa and enteritis under two years, and 27 (3) from influenza. The figures in parentheses are those for London itself.

The two deaths provisionally classified to small-pox were assigned to Stepney and Willesden. Liverpool reported 4 deaths from measles; Bootle, Bradford, and Tynemouth each 3. Liverpool also reported 3 deaths from whooping-cough; Bradford 3 from diphtheria. The highest figure for deaths from diarrhœa comes from Birmingham, 5; Liverpool following with 4, and Leeds with 3.

The number of stillbirths reported during the week was 281 (corresponding to a rate of 40 per thousand births), including 46 in London.

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

CCXCVI.—THE TREATMENT OF STERILITY IN WOMEN.

PART II.—LOCAL MEASURES.[1]

THE methods of examination discussed last week may show some generalised condition of the pelvic tract, a general under-development or inflammation, or a gross lesion such as multiple fibroids with chronic inflammatory degeneration of the tubes and ovaries. One or more of the following conditions may call for treatment.

Intact or Painful Hymen.

Quite apart from vaginismus, the amount of obstruction caused by the hymen is relative and has to be treated on this basis. Comfort and confidence must be assured to the patient. In dealing with minor trouble the passage of vaginal dilators may be sufficient, but in my experience it is usually worth the patient's while to undergo operative measures under anæsthesia. The hymen is incised to its base in the mid-line posteriorly and the tips of two fingers of the left hand introduced to stretch the orifice to the required extent, the musculature at the base of the hymen being nipped meanwhile until sufficient room is obtained. The remains of the hymen are then removed, and the diamond-shaped space produced by the incision is sutured from its upper to its lower limit. Sometimes a large vaginal dilator is left in situ for some hours. The patient need not be kept in bed for more than two or three days. At the end of a fortnight a very important part of the treatment is performed. A series of vaginal dilators is passed not so much to dilate the parts as to prove to the patient what can be achieved without pain.

Vaginal causes of sterility are comparatively infrequent. Malformations and narrowings occur, and must be treated when they are considered to be factors in the prevention of conception.

Malposition or Abnormality of the Cervix.

The position and health of the cervix are of the first importance. If, as already indicated, the spermatic fluid is deposited elsewhere than on the cervix, its rapid deterioration, due to the acid reaction of the vagina, is assured. Malposition of the cervix occurs most frequently in association with retroflexion, when its position is always forward. The condition of retroflexion of the uterus may be directly associated with a further cause for sterility, kinking of the tubes, and tends to be associated with their further degeneration. Retroflexion is a frequent cause of secondary sterility. When a retroflexion appears to be the cause of sterility, if it is otherwise symptomless and the uterus and appendages are free from any suspicion of adhesions, the simplest treatment, well worth while before operative measures are suggested, is readjustment of the position with a sound and the insertion of a Hodge pessary. This can be done in many cases without anæsthesia. It is best to introduce the sound, with the help of speculum and volsellum, while the patient lies on her back, manipulate the uterus into its right position, and then turn the patient into the knee-elbow position before removing the sound and introducing the pessary. Air pressure maintains the uterus in its new position until the Hodge is suitably placed. The pessary can remain in situ for three to four months without douching, and must be retained for three to four months after pregnancy has occurred. I have no faith in the method often practised of "pushing up" the uterus or adjusting it bimanually without anæsthesia and without a pessary, as giving anything but the most temporary relief. I have, however, known the uterus to retain an improved position after such treatment long enough for pregnancy to occur.

If the uterus is fixed in retroflexion (in which case there are adhesions also of the tubes and ovaries), or persists in falling back in spite of the support given by a Hodge pessary, abdominal operation must be resorted to. It is not always easy to be sure whether or not a uterus is fixed. If adhesions are of old standing there may be no tenderness, though movement of the cervix from side to side usually elicits pain; on the other hand, the retroflexed body without adhesions may be very sensitive from congestion.

Acute anteflexion also results in a bad position of the cervix. It lies forward and points forward and is often poorly developed. Dilatation is indicated with the use of a uterine stem, which should allow of drainage, for a few days. These cases are less satisfactory to treat than are retroflexions. A long, pointed cervix may need dilatation and partial amputation.

A normal cervix with pin-hole os may need dilatation. Apart from this, the operation of dilatation of the cervix with or without curettage, according to the condition of the uterine body, gives good results in many cases for no obvious reason. The opportunity should always be taken to test the patency of the tubes under the same anæsthetic. If curettage is considered necessary, it should be done after the insufflation. Further, the cervix may have been pushed completely out of place by pelvic tumours or dragged out of place by scarring from old tears.

Any lesion involving the health of the cervix must be dealt with. Cervicitis may be present, following infection by gonococcus or other septic cocci, or lacerations may be associated with erosion. It is true that pregnancy may occur in spite of such lesions, but any lesion that interferes with the normal alkaline reaction of the cervical canal or alters the normal mucous secretion to pus is a definite obstacle to penetration of spermatozoa into the uterus. The fact that the methods of treatment advocated for cervicitis and erosions are so numerous is an index of the difficulty of curing these conditions. For success are needed patience, persistence and variation of the methods adopted, rest if possible in the early stages of treatment, and security from risk of further infection.

Uterine Body.—Inflammatory changes in the mucosa and fibroids of the submucous type are potent causes of sterility. Given normal tubes, myomectomy may give positive results, sometimes even when the uterus is considerably distorted by the operation.

[1] Part I. appeared last week.

Blockage of the Fallopian Tubes.

Treatment of the tubes is of value, varying with the site of the lesion. If there is blockage of the fimbriated extremity, which can be released, the prognosis is good. Hence, from the point of view of sterility, in all acute inflammations of the tubes it is important to operate as soon as possible after the temperature has finally settled at normal. Then one finds the tubes closed by adhesions, easily separable, to the back of the broad ligament or the pouch of Douglas. One or both tubes can often be saved by separating them carefully, opening up the fimbriæ, milking out the pus, and lifting the tubes with the uterus, which often needs suspension. I have been astonished at the number of patients who have become pregnant after such treatment. If an artificial opening must be made in a tube permanently blocked at the fimbriated extremity, it is important to evert the edges, exposing as little raw surface as possible, and leaving a strand of catgut through the new opening. There is reasonable hope of pregnancy ensuing in these cases. Where obstruction exists at the uterine end of the tube the prognosis is bad, though some surgeons have achieved success even here.

Ovarian Dysfunction.

Ovarian function is manifold and by no means completely understood. Where gross lesions exist, associated with sterility, their surgical treatment has sometimes resulted in pregnancy. When underdevelopment is suspected, from evidence of irregular, infrequent, and scanty menstruation or adiposity, gland products containing thyroid, anterior pituitary and ovarian substance are indicated, although it is very doubtful whether the two last-named extracts have any action unless they are injected hypodermically. Injections of the female sex hormone, prepared commercially from the placenta and standardised as "estrogen" are under trial. The great objection to this line of treatment is the number of intramuscular injections which have to be given to produce results. Small doses of X rays to the ovaries have given good results. The average dosage is 10 per cent. of the skin erythema dose, and is usually repeated two or three times. Menstruation has appeared where amenorrhœa existed, increased frequency and loss in cases of oligo-menorrhœa, each being followed by pregnancy after a short interval.

Treatment by Artificial Insemination.

This is only indicated or likely to give good results when there is impotence on the side of the male partner, his semen being healthy, and when the wife is normal. It may also be tried with hope of success in those cases where, the husband being normal, repeated post-coital examination shows no living spermatozoa on the cervix. It is important to choose the time of greatest fertility, to obtain a condom specimen under conditions as normal as possible, to retain the temperature of the specimen, and to inject as soon after emission as possible. In cases of impotence injection on to the cervix may be sufficient; otherwise a few drops of semen should be injected at low pressure into the uterine cavity. In any case, it is likely that repeated injections will have to be made.

Conclusion.

There still remain numbers of sterile marriages, where no treatment can be defined with confidence because the cause is so obscure. If a full investigation has been made, the cervix has already been dilated in association with insufflation. Attention should be paid to the general health of both man and wife, and advice given on change of scene, temporary abstinence, or any other detail suggested by the history of the individual case.

FRANCES M. HUXLEY, M.D., Ch.B. Manch.,
Surgeon to the South London Hospital for Women.

Special Articles.

PHYSIOLOGY—THE BASIS OF TREATMENT.*

BY PROF. W. E. DIXON, F.R.S.

The Omission of Treatment from Text-books of Medicine.

WHEN the sciences of physiology and pathology a century ago passed from the realms of natural history to deduction and experiment, they naturally attracted the more original and eager minds in medicines, and the text of the writings of the nineteenth century deals with changes in structure and function. Treatment became neglected, the old shibboleths and rituals of treatment which had held sway for centuries were discarded, and there was nothing with which to replace them.

In the middle of the last century S. Skoda and K. Rokitansky (in Austria) perfected a system of physical diagnosis which has had a practical bearing on medicine ever since. Skoda made many experiments with drugs on the patient without any expectation of producing benefit; the patients were not improved and Skoda thought it mattered little how the patient was treated. It is right to say, however, that these experiments were deficient in many respects according to modern views. At this period the Vienna School held a prominent position in scientific medicine and the new doctrine rapidly spread. The physician studied disease in the patient: its beginnings, its progress, its effects, and the scars it left, as shown at autopsy. Scientific medicine looked askance at treatment; text-books spent many pages in describing the symptoms, diagnosis, and pathology of disease, but two or three lines dismissed the treatment; and even in our times the "scientific" physician is apt to be a diagnostician rather than a healer. The study of disease as an entity was the object aimed at, and a complete case was one which went to autopsy. That most admirable and popular text-book of medicine by the late Sir William Osler was typical of the text-books of the time. Dr. Simon Flexner once told me that Osler's book, characterised by its almost complete lack of indications for treatment, was largely responsible for the Rockefeller millions given to medicine. The text-books of the period told with considerable precision what was happening in the body during disease and what was likely to happen, but little or nothing on prevention.

This state of affairs was unavoidable; there was no specific treatment, there was no science of treatment, for such a science could only come into existence when physiology and pathology had reached some degree of precision. Diagnosis was then and is now far ahead of treatment; diagnosis is often accurate where there is no satisfactory treatment and yet diagnosis is only a means to the end.

[Prof. Dixon explained that the science of pharmacology was comparatively new, being the climax of physiology and pathology devised to subserve a practical end. He gave his reasons for depreciating the study of physiology only from the aspect of chemistry and physics. He said:—]

The Deflection of Physiology from Medicine.

I am by no means averse from the vast amount of academic research on these lines which is published annually, often by workers with little biological knowledge or training, but it surely should not precede the more immediate practical aspects of the subject. The modern attitude is expressed by a distinguished young biochemist who, in reviewing a well-known book on chemotherapy in 1928, asks "Might not the time and resources spent on chemotherapeutic research be diverted more profitably to the study of chemical and physical mechanism?" The same attitude is reflected in the awards of Fellowships and Scholarships for Medical Research. Formerly all the recipients were primarily biologists

* Part of the Presidential Address delivered to the Section of Physiology of the British Association for the Advancement of Science at Capetown on July 24th.

with a medical training: now a medico-biological training is unusual. Physiology in the broad sense in which it was used by Claude Bernard and Huxley has given place to a new physiology of physico-chemical reactions: I might go beyond this and say that physiology is getting further and further from practical medicine, and this is the more regrettable as most of the Chairs in Physiology are connected with the Medical Schools and because the science of treatment is largely dependent on experimental physiology. Prof. J. S. Haldane clearly had this in mind in 1923 when he wrote: "We may say without serious misrepresentation that the official present-day view of physiologists is that physiology . . . aims at investigating the physics and chemistry of life, and might properly be called biophysics and biochemistry."

[Prof. Dixon deplored the fact that biology had lost ground as an educational subject in the last twenty years, and urged that renewed attention should be paid to this science and also to pharmacology. He proceeded:—]

The Neglect of Pharmacology.

No branch of experimental biology has received less consideration in Great Britain than that of pharmacology; it is also the most neglected branch of medicine. And although the object of medicine is the healing of the sick, it is amazing that medical schools in Britain, often equipped with all other modern laboratories, lack departments of therapeutics. I was once asked at a meeting, by a leading medical man, what has pharmacology ever done? The answer is, of course, that it has formulated and brought reason and knowledge into treatment of the sick; so much did it impress that great pathologist, Ehrlich, that he left his sera and turned his attention to drugs, and with the unlimited resources at his disposal gave the world, amongst other drugs, salvarsan: so much did it impress the brilliant French chemist, Mr. Fourneau, that he has confined his studies to those of drugs, a study which has resulted in the synthesis of many valuable arsenical compounds and dyes. In America many centres, including the Rockefeller Institute, have turned to the study of drugs; and Italian pharmacology is doing the same.

Stereotyped Prescriptions.

I have heard it said by a leading official of our Ministry of Health, speaking to panel practitioners, that they, in the Ministry, do not want stereotyped prescribing in treatment. Surely there was never such nonsense. If there is a best treatment, let us have it whether it is stereotyped or not. In this respect the British Medical Association has given the profession a lead and shown by the experience of a great number of doctors that there is a best way of treating varicose ulcer in which the patient gets well quicker than by other ways, an advantage both to the patient and to the community who have to keep him whilst he is unfit for work.

Separate Physicians for Diagnosis and for Treatment.

The British physician is a skilled diagnostician and is in the forefront in all that pertains to this subject. The literature is so extensive that it is impossible for the average clinician to do more than this. But how few of them do, or perhaps the more correct word is "can," occupy the same time in the study of recent advances in general therapeutics? The successful physician has, generally speaking, to be content with such references to treatment as are to be found in clinical reading. The general physician must always be a necessity for diagnosis; but the details of treatment of patients will, I believe, in the future be handed over to those who have made a special study of the treatment of that particular group of diseases from one of which the patient is suffering. This is already the position in tuberculosis.

Experimental Methods in Therapeutics.

But the advent of institutions for experimental therapeutics is upon us, though Britain has taken little part in the movement. In this connexion we welcome the magnificent buildings of the University of Cape-town, and when the new hospital with its medical school is completed I confidently anticipate that adequate accommodation will be provided for that important branch of applied physiology, pharmacology, and that this will include laboratories of physiology and organic chemistry, which must be in close and direct association with the wards. The enormous importance of one branch of treatment to Africa, chemotherapy, I will refer to later. From what has been said, it is not surprising that British pharmacology should be so much behind that of other countries in the production of new curative remedies; practically all come from abroad; I may mention ephedrine for spasmodic asthma, liver extract for pernicious anæmia, insulin, the organic arsenicals, the dyes such as 205, the new anæsthetics local and general, hypnotics, and many others.

Fallacies in Experiments on Healthy Men.

It has been often stated that the action of remedies may be best determined by experimenting with them on healthy men. This is not true; quinine is used to treat malaria, yet not one of the subjective symptoms induced in man has the remotest connexion with its curative properties. The same is true of the use of the iodides in syphilis and salicylates in rheumatism. The experiments of Joig and his pupils in 1823 with camphor, digitalis, and other drugs on healthy men added nothing of value to pharmacology. Subjective sensations are, it is true, produced which are erroneously attributed to the drug which has been taken. The late Dr. Rivers and myself were nearly the dupes of such an experiment which I will give in full because it illustrates the imaginary sensations and effects produced by S. Hahnemann and his pupils, by Perkin with his retractors, and by more modern physicians with their mystic apparatus.

Our experiments were made on healthy men under a regular régime as regarded sleep, exercise, and diet. The men were practised with the use of the ergograph during several weeks at the same hour daily, until their output of work was constant. We found that the administration of a dose of caffeine dissolved in water one hour before the experiment greatly increased the output of work for that day. This was repeated on several occasions, always with the same result, and we naturally regarded the effect as due to the caffeine. This, however, was not the case: the effect was due to the ritual of taking a drug; the drug day assumed an enhanced importance in the mind of the operator and the mental effect sometimes referred to as suggestion was principally responsible. We had no difficulty in showing that water made bitter with a trace of quassia or other simple bitter had a similar effect.

Few, if any, experiments made on man without the most careful controls are of any real value. Properly controlled experiments have been made, however, with many substances. Precise experiments, for example, have been made both in Germany and America with bromides in epilepsy. In these experiments half the epileptics were given potassium chloride and the other half sodium bromide; after several weeks' use the bromide had decreased the number of attacks, whilst the chloride had no distinct action.

[Prof. Dixon discussed the applications of chemotherapy in parasitic diseases and described recent preparations of the ductless glands in disorders of the endocrine system. He then spoke of civilisation as leading to an exaggerated nervous sensibility which was a much commoner feature in those engaged in a mental indoor life than in those engaged in an outdoor physical life. He drew attention to the effect of tobacco in diminishing nervous sensibility and to the circumstance that though beer was a soothing beverage, and caffeine was a stimulating one, it was the supersensitive people who drunk caffeine and not beer in excess. It seemed to him not unlikely that this substitution of tea for beer was not wholly unconnected with the tendency of highly civilised nations to become supersensitive and neurotic, for this was the groundwork upon which drug addiction was built. He concluded:—]

I have endeavoured to show that all precise know

ledge in therapeutics is based upon controlled experiments on animals or man, and that the elucidation of the action of medicaments by the methods and data of experimental physiology is one of the most important steps taken to place medicine on a scientific basis. How important this is may be gauged from the fact that all fundamental advances in treatment in the last 30 years have originated directly or indirectly from experiments on animals. There can be no doubt then that the future of therapeutics, and therefore of medicine as a whole, is intimately connected with physiology; there can be no doubt that advance in the practice of medicine is dependent on those trained in the methods and fundamental truths of physiology, who devote themselves in the ward and biological laboratory to investigating how best to prevent or cure disease and so relieve suffering. Britain for 50 years has every reason to be proud of her progress and achievements in physiology; it is acknowledged that she can show records second to none and that her savants have included some of the world's greatest investigators. It remains for us to hope that in the future she may attain equal success in the associated sciences directly concerned with the relief of suffering and cure of disease.

MENTAL HOSPITALS ASSOCIATION.

THE eleventh annual meeting of this Association was held on July 17th, with Alderman Sir WILLIAM HODGSON (Cheshire) in the chair. The Chairman, in the course of his address, referred to the difficulty of suggesting new legislation at a time of political crisis, but declared that the problems of lunacy and mental deficiency were above party and truly national. Some of the suggestions of the Royal Commission might be taken as sure of general acceptance and would supply urgent needs. He referred to the paramount importance of treatment for incipient mental disorder without certification, and suggested that a conference of local authorities should be called to consider the greatly overdue Lunacy Bill, which would meet with general support if formed on enabling rather than compulsory lines. It was most desirable that the Government should realise that the spirit of local government must be protected from excessive arbitrary interference by central officials. The Association's advance in strength and influence had been based upon steady insistence on efforts to gather information and on the absence of any interference with the absolute autonomy of visiting committees. Organisation for mutual helpfulness was the keynote of their work, which was too humanitarian for isolation or personal or political preference.

The first business on the agenda was an expression of regret that another year had passed without legislation to reform the lunacy laws. The Committee hoped to see a Bill introduced very soon, and the meeting cordially endorsed this hope.

The Committee drew attention to the serious shortage of accommodation and the prohibitive cost of building. Councillor W. M. CLARK (Durham) said that Durham had saved £3000 on an outside estimate by utilising material and labour available within the institution, but Councillor HOPKIN (Nottingham) pointed out the objections which the trades-unions would raise if this plan were widely followed. He thought there was no hope of obtaining the required accommodation in reconstituted poor-law hospitals, because the institutions were needed for old age pensioners unable to live at home on their pensions. If they could be helped to live outside, the beds they occupied might become available for mental cases. Alderman E. H. MOLE (Glamorgan) pointed out that this might be true in industrial areas, but agreed with Alderman R. BRUFORD that the problem of accommodation in other areas would solve itself when one authority was responsible both for poor-law and mental hospital work.

The Mental Nurses' Examination.

This vexed problem again came up for consideration, and an acute difference of opinion became manifest. For thirty years the examination and certification of mental nurses was in the hands of the Medico-Psychological Association, and the syllabus was drawn up by medical superintendents with reference to the special needs of the work they control. With the incorporation of the General Nursing Council a difficult situation arose. As Dr. G. H. GRILLS expressed it in proposing a motion, the G.N.C. did not want the advice of medical superintendents, and would not have it, and in his opinion most medical superintendents found the syllabus proposed by the Council quite impracticable. His motion was:—

> That this meeting views with some apprehension the existing unsatisfactory conditions regarding the national registration of mental nurses, and urges the General Nursing Council for England and Wales to provide that the possession of the certificate of proficiency in mental nursing awarded by the Royal Medico-Psychological Association shall entitle the holder thereof to be registered, on payment of the fees, in the mental section of the register of nurses of the General Nursing Council.

He pleaded strongly the difficulty of sparing nurses from a mental hospital to go to a distant centre for examination, and of their finding the money for fares and lodgings, as well as the five-guinea fee, and declared that a first-year probationer trained on M.P.A. lines was more use in a mental hospital than a fully registered general nurse. She must acquire in her first year an elementary knowledge of mental nursing and of first-aid, or she was useless in the wards; the G.N.C. syllabus postponed these subjects to the final examination. It was impossible, he thought, to have a single portal of entry for every kind of special nurse. Not more than two mental hospitals in England and Wales made the G.N.C. examination compulsory, and soon there would not be a single registered nurse in the mental hospital service, which would be a serious situation.

On the other hand, Dr. J. I. RUSSELL (N. Riding, Yorks.) and Dr. J. F. FRANCIS (Leicester), supported by Dr. D. RICE (Norwich) and Dr. R. EAGER (Devon), took the attitude that the position must be accepted and some compromise found by the medical superintendents. The General Nursing Council, they argued, was a statutory body, and its formation had undoubtedly been a forward step. It had now decided finally that it would not delegate its powers to any voluntary body, and that it regarded control of examinations as a part of its duties. This being so, its examination was the legal one and must be accepted sooner or later, and the medical superintendents were, in a sense, deceiving their probationers by encouraging them to take another diploma and dismissing them if they did not. Dr. FRANCIS said his committee had recognised the inevitability of the situation, and had given up training for the M.P.A. certificate. The examination fee was repaid by the bonus given to the nurses who had passed the examination. He had found no insuperable difficulty in teaching the requisite special subjects during the first year while training probationers for the G.N.C. examination, or in sending the nurses to the examination centre. He suggested that the M.P.A. might organise a higher special examination, to be taken by mental nurses after registration. Finally, it was decided to refer the matter to the executive Committee for consideration and report.

Other matters briefly discussed included the degree of control of mental hospital finance which should be exercised by the local authority; the degree of control that should be exercised over minor items in the uniform dress of members of mental hospitals' staffs; the facilitation of removal of patients to mental hospitals near their homes or relatives; and the reduction of railway fares for relatives visiting patients in mental hospitals. Alderman R. BRUFORD (Somerset and Bath) was elected chairman, and

Alderman W. E. LOVSEY (Birmingham) vice-chairman, and Alderman C. HORNBY (Lancs) was reappointed hon. treasurer for the ensuing year. The Committee was re-elected, with the addition of the retiring chairman, of Miss BRISCOE of Fulham, and of Councillor GEORGE HUNT of Leicester.

The Salaries of Medical Officers.

During the morning the meeting went into committee to discuss a memorandum on the salaries of whole-time medical officers, which was accepted and confirmed. This scale of salaries was the outcome of a conference held at the Ministry of Health between representatives of the County Councils Association, the Association of Municipal Corporations, the Urban District Councils Association, the Rural District Councils Association, the London County Council, the Association of Education Committees, the Mental Hospitals Association, the Metropolitan Boroughs standing joint committee, and the British Medical Association. Briefly, the annual salaries agreed upon are as follows:—

Officer	Minimum commencing salary	Annual increment	Maximum	Emoluments
Resident medical officers and assistant M.O.'s. in mental hospitals	£350	£25	£450	Board, lodging, laundry, and attendance
Medical officers with at least 3 years' post-graduate experience ..	£500	£25	£700	
Senior medical officers — i.e., those in charge of services or departments ..	£750–£1100†	£50 every 2nd year	£1100	
Medical superintendents (excluding mental hospitals)—i.e., institutions with more than 100 beds	£750–£1100‡	£50 every 2nd year	£1100	included in salary
Medical officers of health*	£800–£1800‖			

* Assistant M.O.H.'s 60 per cent of this scale.
† According to responsibility and scope. ‡ An additional £50 for each 100 beds over 200. ‖ According to population.

After an office has been held at the maximum salary for four years, the employing authority is to consider whether the officer's remuneration should be increased beyond the maximum. The scale is not to apply to posts limited to a term of one year, or to officers without previous professional experience. There is to be no differentiation of salary on account of sex, and any intention to dismiss on marriage should be specifically stated in the advertisement. The memorandum mentions the desirability of providing married quarters for assistant medical officers in mental hospitals, and of allowing at least four weeks' annual leave. An additional £50 per annum is recommended for officers who hold the Diploma in Psychological Medicine. Only the first annual increment is to be allowed to officers who, in the opinion of their medical superintendent, do not take advantage of the opportunities offered them for obtaining the diploma. Temporary medical officers should not ordinarily be employed, the conference advised, for more than twelve months, and clinical assistants should not be appointed to undertake the duties of junior medical officers. An advisory committee is to be constituted to deal with any difficulties arising out of the working of this agreement, which is to come into force on April 1st, 1930, and to remain in force for five years, and thereafter from year to year, subject to one year's notice from any of the contracting parties. These recommendations meet, in practically every respect, the requirements of the British Medical Association, out of which the conference arose in the first place.

MEDICINE AND THE LAW.

Shewry v. Maybury.

THE lengthy litigation in the case of Shewry *v.* Maybury has ended in a manner satisfactory neither to plaintiff nor defendant, and presumably satisfactory neither to judge nor jury. The special jury, it will be remembered, after a trial lasting a week, failed to agree on the question whether the condition of the infant (Leslie Shewry) was caused by Dr. Maybury's treatment. The jury had agreed in its answers to a string of other questions already summarised in these columns,[1] and on July 9th Dr. Maybury's counsel asked that judgment might be entered for him since the plaintiff had failed to establish his case. The point at this stage for the Lord Chief Justice to decide was not how he would himself have answered the question on which the jury disagreed. Had that been his duty, Lord Hewart would, he said, have answered in Dr. Maybury's favour. The point he had to decide was whether or not there had been evidence to go to the jury upon which the jury might have answered the question in the opposite way. Lord Hewart, therefore, reserved judgment in order to give himself the opportunity of carefully re-reading the whole of the evidence; eventually (on July 19th) he gave his considered decision. He decided that, notwithstanding his own personal view, he would not have been entitled at the original trial to rule that there was no case to go to the jury. He would not have been entitled to direct the jury to find a verdict for the defendant. "There was, I think, some evidence, including some medical evidence, which, if the jury were prevailed on to accept it, was sufficient to entitle them to answer affirmatively the question 'was the condition of this infant caused by the treatment administered by the defendant?' . . . It may well be that, in view of the intrinsic nature of that evidence, and of the contrast between it and the cogent evidence adduced on behalf of the defendant, such an answer would have excited legitimate surprise. But all such considerations appear to me to be quite irrelevant if, in fact, there was a conflict of evidence for the jury to determine. Here, I think, there was such a conflict, and the jury having disagreed, it is not possible for me to enter judgment."

The result is that, notwithstanding that the Lord Chief Justice has now on two occasions made known his opinion that on the merits of the evidence the verdict should be in favour of Dr. Maybury, the disagreement of the jury upon a fundamental question vitiates the patient trial before Lord Hewart and leaves the plaintiff at liberty to start his action afresh. If this latter course is taken, twelve laymen will once more be selected to decide a technical issue; plaintiff's counsel will once more seek to inflame their natural sympathies by a terrible story of a healthy baby subjected soon after birth to unnecessary and improper treatment resulting in incurable mental deficiency and epilepsy; expert witnesses will once more come forward to say that whatever a medical practitioner decided to do nine years ago was wrong though he saw the patient at the time and they did not; "cogent" evidence will be given again on Dr. Maybury's behalf that he was right, and finally the jury will be expected to reach the mediæval standard of unanimity in the face of a puzzling series of questions framed by the judge with an eye to possible legal arguments in the Court of Appeal. The death of the child is the only new fact to be considered upon a re-hearing, and unless there is a post-mortem examination, this fact may be without significance. Nothing, it is agreed on all sides, could have been more lucid or impartial than the Lord Chief Justice's summing up. But, as he has himself explained in his judgment, a judge cannot be placed in the position of a jury; unless he found himself able to declare that a verdict by the jury against Dr. Maybury was impossible he cannot supply the

[1] See THE LANCET, 1929, i., 1375.

deficiency which the jury's disagreement has caused. Comparison between the judicial faculties of judge and jury is otiose—on the one side a man expert in the knowledge and application of the law, familiar with previous actions depending upon allegations of negligence, and trained to weigh evidence and exclude irrelevancies; on the other side twelve casually chosen laymen who have none of such gifts. The Lord Chief Justice, it must be reiterated, has twice declared that, had he had the power, he would have decided in Dr. Maybury's favour; the jury has not been able to decide unanimously against Dr. Maybury. No recent case has so flagrantly exhibited the occasional discrepancy between a judge's and a jury's view of identical facts, or the disadvantage of leaving technical issues (affecting a defendant's professional reputation and livelihood) to a jury of laymen. It will stimulate and justify the demand for some other form of tribunal. The use of medical assessors would at least abbreviate the length of such a trial. In any case it would seem reasonable that there should be some form of protection for a medical practitioner against charges of negligence relating to treatment given as much as eight years ago.

SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

The Medical Curriculum.

ON Thursday, July 18th, the graduation proceedings took place in connexion with Edinburgh University; the ceremonies were held in the M'Ewan Hall, and Prof. J. T. Mackie, Professor of Bacteriology in the University, delivered an address to the new graduates in which he outlined the defaults of the system, of which they were the most recent victims. Once again the curriculum was indicted as over-loaded—in Prof. Mackie's eyes it "resembled a building originally compact, extended in the course of time by new storeys and annexes, always commodious, but tending to become somewhat rambling, and—worse still—top-heavy on its foundations." Accordingly he concludes that "the time has perhaps come when it should be razed to the ground, and rebuilt on a new plan." He followed this expression of policy, which must be regarded as summary when applied to the outcome of (say) seventy-five years of developments, by stating that, while the study of medicine might be regarded as that of a great branch of biology, so that medical workers might be expected to furnish the world with supreme biologists, the graduated approach between biological studies and the minutiæ of anatomy and physiology was wanting in the curriculum, which, in this place therefore was irrational. Is this a weakness in the curriculum which can be met by extension of time? Or can it be met by an alteration of the examinational system, by which certain subjects, or the developments of certain subjects, are relegated to post-graduate work? Or, without altering the time of the medical course proper, can pre-medical studies be framed so as to lighten subsequent studies, while being available for the mass of students? Prof. Mackie, in his comprehensive survey of medical education, did not ask precisely those questions, but they are the questions which have to be faced, and towards a reply he made the suggestion that, on the analogy of the honours degrees in other Faculties, the University graduate in medicine might be able to take a pass or an honours degree.

Cowan House, Edinburgh.

A further £20,000 has been presented to the University of Edinburgh by Mr. Thomas Cowan primarily for scholarships to promote the entry of students of small means as residents into Cowan House. This House, which is now nearing completion, is designed to be a social centre for male students of British extraction, and to attract as residents young men who, in respect of intellectual force or other personal characteristics, are likely to have a useful influence on their fellow-students and to become a credit to the University.

Since it is difficult to foresee how far the provision of scholarships may be necessary or desirable, Dr. Cowan is leaving the University full powers to apply the fund in any other way that will develop the usefulness of Cowan House.

Housing Conditions in Edinburgh.

Since the inauguration 30 years ago of a Sanitary Department in Edinburgh over 5000 uninhabitable houses have been closed. The housing policy of the Corporation is now making good progress in the abolition of the slums by means of improvement schemes and the re-housing of the occupiers in more congenial and hygienic surroundings. At the end of 1928, 1034 houses had been inspected under the Housing Regulations (Scotland) 1928, and of that number 971 were considered to be in a state so dangerous or injurious to health as to be unfit for human habitation. In connexion with 57 houses closing orders were made. A reduction in overcrowding was reported. In the last three years the number of cases of overcrowding brought to the notice of the Department has fallen from 1640 in 1926 to 1542 in 1927, and 1323 in 1928. In 146 cases the overcrowding was due to or aggravated by the keeping of lodgers or the sub-letting of rooms. In the one-apartment overcrowded houses as many as 8 to 11 persons were found in residence, and in the two-and three-apartment houses as many as 10, and in one case 19, persons were found.

Animal Diseases.

At the annual meeting of the Animal Diseases Research Association of Scotland, held at the Moredun Institute, Gilmerton, a year of progressive work was reported. The Association now possess a well-equipped Institute with facilities for all kinds of research, but the lack of trained observers is still felt; there is, for example, urgent need for a clinician on the staff of the Association. As lamb dysentery can now be controlled, its general nature being understood, it has been possible to cease intensive work on it and take up louping-ill and the braxy-like diseases of sheep. Grass sickness in horses is the outstanding unsolved problem in front of the Association; information concerning the disease has been collected and distributed to the numerous collaborators. A scheme for the investigation of bovine abortion disease is under the consideration of the Empire Marketing Board. Transmission experiments with scrapie are in hand, and Calmette and Guérin's tuberculosis vaccine is being used, although with due reserve about its value.

Tuberculosis in Fife.

Dr. Pratt Yule states that the mortality-rate from tuberculosis in the County of Fife in 1928 was less than half what it was in 1914, the present rate being 0·70 per 1000. Various factors are responsible for the lessening grip of tuberculosis on the community, but Dr. Yule regards as most important the steady campaign that has been waged against the disease since 1912. The Fife scheme differs from that usually accepted as necessary for the control of tuberculosis. Hitherto, dispensaries had not been established in the county, the patient being visited, examined, and supervised in his home. The mortality-rates compare favourably with those of other Scottish counties of like industrial characteristics.

New Scientific Institutions in Aberdeen.

The notable additions during the past year to the medical and scientific resources of Aberdeen were recorded by Sir George Adam Smith, Principal of the University, on Graduation Day. The new Hospital for Sick Children has been completed and opened. An Imperial Bureau is being founded in close connexion with the Rowett Institute for Research in Animal Nutrition, which is to be the centre for

recording and classifying researches in progress on animal nutrition throughout the British Empire. The National Department of Scientific and Industrial Research is to open another laboratory in close connexion with the University departments of physiology and bacteriology, and the Scottish Department of Agriculture had arranged for the establishment in Aberdeen of an Institute of Soil Research to be named the MacAulay Research Institute. This Institute will be run by a committee of 11, representative of the University, of the three Scottish Colleges of Agriculture and of the Scottish Department of Agriculture. The capital expenditure will be met by Mr. MacAulay, an Aberdonian now resident in Canada, up to a maximum of £10,000.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Comdr. H. M. Langdale is placed on Retd. List with the rank of Surg. Capt.

The following appointments are notified:—Surg. Lt.-Comdr. N. B. de M. Greenstreet to *President*. Surg. Lt.-Comdrs. (D.) M. F. Hopson to *Rodney*; and W. E. A. Sampson to *Vivid*, for R.N. Barracks, Devonport; J. L. Jean to *Vernon*; E. C. Bevis to *Victory*, for R.M. Infirmary, Portsmouth; H. J. Luck to *Victory*, for R.N. Barracks, Portsmouth; L. M. Hughes to *Pembroke*, for R.N. Barracks, Chatham; and F. W. Watt to *Victory*, for R.N. Barracks, Portsmouth; Surg. Lt. A. J. Burden to *Cockshafer*. Surg. Lts. D. Duncan to *Cambrian*; and H. N. V. Barnes to *Vivid*, for R.N. Barracks, Devonport.

ROYAL NAVAL VOLUNTEER RESERVE.

Prob. Surg. Sub-Lt. V. S. Hughes-Davies to be Surg. Sub-Lt.

Prob. Surg. Lt. A. L. Gunn to be Surg. Lt.

The following appointments are notified:—Surg. Lts. T. C. Stevenson and G. A. O. White (D.) to *Victory*, for R.N. Hospital, Haslar, for training; Prob. Surg. Sub-Lt. F. W. Chippindale to *Victory*, for R.N. Hospital, Haslar, for training.

ROYAL ARMY MEDICAL CORPS.

Capt. I. F. MacKenzie, late R.A.M.C. Spec. Res., to be temp. Capt., and temporarily relinquishes the rank of Capt.

Lt. (on prob.) R. R. Leaning, from the secd. list, is restd. to the estabt.

Lt. D. A'Brook is secd. under the provisions of Art. 205, Royal Warrant for Pay and Promotion.

TERRITORIAL ARMY.

Lt.-Col. J. S. Y. Rogers having attained the age limit retires and retains his rank, with permission to wear the prescribed uniform.

Lts. F. W. Bury and A. Barr to be Capts.

Hon. 2nd Lt. B. Reid (late R.A.F.) to be Lt.

ROYAL AIR FORCE.

H. C. S. Pimblett is granted a short service commission as a Flying Officer for three years on the active list.

Flying Officer C. Crowley ceases to be seconded to the Manor House Hospital, Golders Green.

Flight Lt. J. Twohill is transferred to the Reserve, Class D ii.

DEATHS IN THE SERVICES.

Deputy Inspector-General Charles William Buchanan-Hamilton, R.N., retired, who died on July 13th, entered the Royal Navy as surgeon in 1878 and reached the rank of Fleet Surgeon in 1894. He served throughout the Egyptian War, 1882, as surgeon to the *Beacon*, and was present at the bombardment of Alexandria, the seizure of the Suez Canal, the occupation of Port Said, Suez, and Ismailia, and at the surrender of the Aboukir, Damietta, and Ghimileh Forts (Egyptian Medal, Alex. Clasp, Khedive's Bronze Star). He also served as surgeon with the Royal Marine Battalion in the Soudan Expedition of 1884, and was surgeon of the Royal Victoria Hospital, and of H.M. *Sphinx*, at Suakin, until the close of the campaign (Suakin Clasp). He was surgeon of the Naval Brigade in the Burmese War, 1885, and was attached to the Burma Field Force in the advance to Upper Burma, and in the Indian Marine ship, *Tigris*. He also took part in the occupation of Mandalay and deposition of King Theebaw, and in subsequent operations (India Medal, Burma, 1885–87, Clasp). Previous to his retirement with the rank of Deputy General of Hospitals and Fleets in 1907 he was fleet surgeon of Sheerness Gunnery School and Dockyard.

BRITISH MEDICAL ASSOCIATION.

ANNUAL MEETING IN MANCHESTER.

PROCEEDINGS OF THE REPRESENTATIVE BODY.

THE annual Representative Meeting of the British Medical Association opened in Manchester on July 19th with Dr. C. O. HAWTHORNE in the chair. The President-elect, Prof. A. H. BURGESS, introduced the President-designate for 1930-31, Prof. W. HARVEY SMITH, of Winnipeg, and a short address of welcome to Manchester was read by the Lord Mayor.

Part-payment by Hospital Patients.

Much of the first day was devoted to considering the Association's hospital policy, which the Chairman said would be for some years the most important business of the Representative Body.

In 1927 the Council was invited to prepare a special "middle-class hospital policy," but it has preferred the alternative of suggesting amendments calculated to bring the present "voluntary hospital policy" into line with the new requirements of the public. These amendments involve, first of all, a change in the classification of the patients, who have hitherto been placed in three groups: (1) those unable to contribute in any way; (2) "private patients" who pay for special accommodation and who arrange for treatment fees independently of the hospital; and (3) an intermediate group of "tariff patients" who directly or indirectly pay part or all the tariff charges of the hospital. On behalf of the Council, Sir RICHARD LUCE proposed that a distinct group of "aided patients" should be recognised. It was to be hoped, he said, that there would be a steady growth of the class who did not want charity and who paid the full cost of their keep in hospital, including fees for medical attendance. This class, to which it was suggested that the term "tariff patients" should henceforth be confined, included those for whom payment was made by public authorities, approved societies, employers of labour, insurance companies or under contributory schemes. Meanwhile, however, there was undoubtedly a large body of people who were able to pay only part of the cost of maintenance and treatment, and the Council held that these should be placed in a definite category. Fees for medical attendance on such patients would be paid to the visiting staff according to what proportion of the full tariff was received by the hospital from the patient or on his behalf.

The proposal to recognise an "aided" class of this kind was vigorously opposed. Sir ROBERT BOLAM for Newcastle-on-Tyne, argued that some 80 per cent. of the industrial population could pay 2*d*. or 3*d*. a week to contributory schemes and thus pay the full tariff scale. But they would never be brought to do so if they were given a chance of paying a little as and when they thought fit. To admit that this large proportion of the public could never be expected to pay its way was to vitiate the whole position from the start. Small contributions should certainly be accepted, but it should never be suggested that they were adequate.—Mr. BISHOP HARMAN did not approve of making categories or policies cover exceptions which were disadvantageous. It was better to have an ideal than to accept the present conditions under which perhaps the majority of patients would fall into the "aided" class.—Dr. J. C. MATTHEWS feared that this amendment of the hospital policy would lend colour to the theory that hospital staffs ought only to get fees for patients who were paying full tariff charges, and Dr. PETER MACDONALD said it would certainly put an obstacle in the way of arranging full contributory schemes at York.

Among other speakers some support was found for the proposal, and Sir RICHARD LUCE argued to the effect that it provided a stepping-stone

between those who were purely objects of charity and those who paid for themselves. But the meeting, by a large majority, decided to send this part of the new policy back to the Council for further consideration.

Private Patients.

The Council's new suggestions about private patients were accepted with but little alteration. The Association's policy tentatively sets out a scale of incomes, rising to £300 a year, over which no one should be admitted to hospital on a tariff basis. Where special accommodation is available at a voluntary hospital, persons earning more than £300 may be admitted as private patients, but as in the case of tariff patients this is not to be done (except in emergency) without the recommendation of a practitioner. The policy now approved provides that when the special accommodation takes the form of private wards in a hospital which has both public and private wards in one building then :—

(*a*) If the hospital has a resident medical officer or officers and also a visiting staff which is ordinarily responsible for the care of all patients in the public wards, the patient should be under the responsible care of a member of the visiting staff in association with his own private practitioner. The latter should have free access to the patient and should have such share of responsibility and treatment as may be agreed upon between him and the member of the visiting staff concerned. This does not apply where the governing body has made special arrangements permitting practitioners not on the staff to have responsible care of their own patients.

(*b*) If the hospital has not such resident officers and/or visiting staff the patient should be admitted under the responsible care of a private practitioner and should be allowed, if necessary, to call in any consultant of his choice.

(*c*) The fees payable by the patient may be determined either by a scale agreed between the medical staff and the board of management, or by private agreement between the medical attendant and the patient.

When, on the other hand, there is in connexion with a voluntary hospital a separate home or annexe exclusively for private patients, then the patient should be allowed to select any available medical practitioner as his attendant, though the latter may be required to show evidence of special knowledge or experience if these are likely to be needed. In the case of cottage hospitals it is recommended that membership of the medical staff should be open to all practitioners in the district and that the patient should have the right to be attended by his usual medical adviser, to whom he would be responsible for fees in the usual way.

Discussion of these proposals failed to reveal any significant cleft of opinion, though on one point, Dr. E. R. FOTHERGILL persuaded the meeting to take legal advice. What would be the position, he asked the Association's solicitor, if the governors of a hospital were sued because they allowed a doctor to maltreat a patient on their premises without previously satisfying themselves of his competence? Would they not be liable for damages?—The fact that the Representative Body has come to take a wry pride in Dr. Fothergill's pertinacity did not prevent it from enjoying Mr. OSWALD HEMPSON'S forensic reply that in the particular circumstances under discussion the patient had himself assumed full responsibility when he called in the doctor.

Services of the Radiologist.

After accepting certain recommendations by the Council concerning the representation of the medical profession on the governing bodies of "separate hospitals or institutions for paying patients not connected with voluntary hospitals," the meeting settled down to consider a memorandum on radiological services. This has been prepared at the instance of the British Institute of Radiology and in the form now approved by the Representative Meeting is likely to be adopted as the policy of the Institute also. It provides, inter alia, that an agreed share of fees received by a hospital for radiological services, or an agreed honorarium, shall be placed at the disposal of the medical staff.

A hospital may, on the advice of the visiting radiologist, arrange a schedule of modified charges for radiological services within a specified scale of income limits, and based upon an average of one half the fees commonly charged for similar private work in the district; but the schedule so arranged is not to be published or exhibited publicly.

A hospital in a district where medical practitioners are privately practising radiology should not provide radiological services for patients able to pay private fees. Where there is no such practitioner the radiologist to the hospital may be allowed to see private patients at the hospital, receiving not less than two-thirds of the fees paid by them.

"The normal approach to the radiologist," says the memorandum, "is through the medical officers of other departments of the hospital, but in exceptional circumstances cases may be referred direct to the radiologist by private practitioners . . . Fees for services to patients in pay beds should be paid to the visiting radiologist in each individual case according to the service rendered, less an agreed proportion to the hospital to meet costs."

The suggestion that in exceptional circumstances the private practitioner may send his cases direct to the radiologist did not pass unchallenged, and Dr. MACDONALD said it would be unwelcome to most members of the visiting staffs of hospitals.—Sir RICHARD LUCE explained that radiologists set great store by it, and it was accepted after Dr. H. B. BRACKENBURY had emphasised the exceptional nature of the circumstances to which it was intended to apply.

Hospitals and Private Practice.

A further appendix to the Council's report, consisting of a "model contributory scheme for hospital benefit" was also agreed to with minor emendations. Brighton argued that such schemes were being worked out for the benefit of hospitals to the detriment of specialist practice; because a private practitioner could not give the services required it did not necessarily mean that the patient should go straight to a hospital. But Dr. H. G. DAIN, whilst admitting that the whole profession would sympathise with this opinion, believed that arrangements for payment of private practitioners could not be embodied in a model contributory scheme for hospitals. And this view carried the day.

Another aspect of the hospital's encroachment on private practice was illustrated in a picturesque speech by Mr. F. C. PYBUS on industrial accident cases. After pointing out that the apparently generous contributions of industrial firms were not always as handsome as they seemed, in view of the services rendered, he remarked that these cases constituted an abuse of the medical staff as well as of the hospital funds. He had recently saved a firm £500 by restoring a patient who was about to be compensated to that extent. Why should such work be done for the many firms who dumped their accidents at the hospital doors, paying amounts which barely covered their keep, and leaving the rest to be made up, perhaps, by pulpit appeals? Why should not such cases be admitted to private wards so that the very expensive labour put into some of them could be recognised by suitable fees? "Going home footsore and weary from my hospital after having saved a few lives and a few limbs," said Mr. Pybus, "I contrasted my position with that of the officer of the law whom the city provides with a State coach and a fanfare of trumpets, going to the courts to award possibly £1000 to one of those persons who had been damaged."

A resolution was passed to the effect that there are two ways by which industrial accidents need not be a charge on voluntary hospitals or on the services of the medical staff: (1) making a charge on industry, which would require legislation; and (2) the development of contributory schemes in connexion with which the services of the staff are recognised in accordance with the policy of the Association.

Pay Beds and the Improvement of British Hospitals.

Dr. CHRISTINE MURRELL, for Kensington, moved:

That the annual representative meeting, on behalf of the British Medical Association, wishes to emphasise the

conviction that pay bed accommodation is wanted not only for those patients who require operative or specialist treatment, but also for those whose need for such accommodation is due to the fact that they cannot receive suitable nursing and domestic attention in their own homes, so that they may receive the attention they require whilst still remaining under the medical care of their own private practitioner.

Supporting this resolution Mr. H. S. SOUTTAR said that everyone was now asking for hospital treatment and it ought to be made available to the whole community. The next few years would see an enormous development; the poor-law hospitals were to be taken over and brought up to date. Before a recent visit to Sweden he had thought he knew what an up-to-date hospital was, but he had discovered there that his ideas were 30 years behind the times. The hospitals of Sweden were as fine as they could be made; everybody had access to them, and general practitioners could use them for their own patients. We too should have first-class hospitals open everwhere to the public and to medical men, but this would be impossible without help from public sources. Hewas certain there was no X ray apparatus in this country as good as what he had seen in Sweden. The reason was simple. To keep such apparatus up to date it had to be scrapped every five years and no voluntary hospital could afford that.

Mr. W. MCADAM ECCLES spoke of the need for peripheral hospitals in addition to the great centres of education and specialist treatment. A hospital charging six guineas a week would need 150 beds to pay its way.

The motion by Kensington was approved.

Salaries in the Public Health Services.

Sir ROBERT BOLAM reported that since the beginning of this year the scale of salaries in the public health services has been under consideration by a conference composed of representatives of the profession and of local authorities and that a provisional agreement had been reached for presentation to the Representative Body and the various associations of local authorities.

The more important recommendations agreed to at conferences between representatives of local authorities and the British Medical Association on the salaries of whole-time public health medical officers are as follows:—

1.—Resident Medical Officers. £350, rising by £25 a year to £450, with emoluments to include board, lodging, laundry, and attendance.

2.—Medical Officers employed in Departments (three years' professional experience). £500 rising by £25 a year to £700.

3.—Senior Medical Officers (not being M.O.H.) in charge of services—e.g., school medical officer. £750 rising to £1100.*

4.—Medical Superintendents of Institutions other than Mental Hospitals. £750 (not exceeding 150 beds) to £1100 (over 750 beds), these salaries to include housing accommodation and board.*

5.—Deputy or Chief Assistant Medical Officers of Health. Sixty per cent. of the appropriate minimum commencing salary of the scale for M.O.H.*

6.—Medical Officers of Health. Population not exceeding 50,000, £800. Population exceeding 750,000, £1600 (County Councils and certain rural and urban districts), £1800 (County Boroughs and Metropolitan Boroughs and certain urban districts).*

7.—Salaries for combined posts, £800.

8.—Ass stant Medical Officers to Mental Hospitals. £350, rising by £25 a year to £450, with emoluments to include board, lodging, laundry, and attendance. Suitable provision for married assistant medical officers should be made. An additional £50 per annum to those with a diploma in psychological medicine.

9.—General Conditions applying to all appointments. These include provision that travelling and other reasonable expenses incurred in the performance of duties shall be paid; the operation of this scale shall not result in reducing the salary of any medical officer; if the right to terminate a medical appointment on marriage is desired, a specific statement to this effect should be inserted in the advertisement of the appointment; no differentiation of salary shall be made on account of sex.

10.—An Advisory Committee, consisting of eight representatives of various associations of local authorities, eight representatives of the B.M.A., and a chairman appointed by the Ministry of Health, to consider the merits of any case of proposed departure from this agreement, or of difficulty in its application.

11.—Duration of Agreement. From April 1st, 1930, for five years, and thereafter from year to year.

This scale, while it is more inclusive, does not differ substantially from that set out on p. 159 of the Annual Handbook of the British Medical Association. The commencing salary in Section 2 (Medical Officers employed in Departments, who have had three years' experience subsequent to qualification) is agreed at £500 (formerly £600). No scale for the medical superintendents of mental hospitals is set out.

Sir Robert recommended that this agreement, set out above, be accepted as a basis of any further negotiations. It was a compromise, and he would not pretend that he was altogether satisfied with it. In some ways the profession might do better with the present system under which constant watchfulness could enforce the offer of salaries attractive to certain sections of medical men. It seemed desirable, however, especially in view of the forthcoming changes in local government, to meet the local authorities in a conciliatory spirit, and it was hoped that the proposed agreement would give the country for the next five years the type of public health service it ought to have. It would make it possible to say to a young man that the question of entering this service was worth careful consideration.

Mr. E. W. G. MASTERMAN criticised details of the agreement but said that the general feeling must be one of great gratitude to Sir Robert Bolam for doing so much to negotiate it.—Dr. MIDDLETON MARTIN thought it marvellous that any conference should have achieved such a document.—Dr. J. T. D'EWART said it would greatly improve the position of junior members of the public health services, but wished that more could have been done for older men.—Dr. H. W. POOLER and Dr. H. KERR drew attention to certain anomalies in the payment of medical officers; Dr. EUSTACE HILL said that the Society of Medical Officers of Health was not entirely satisfied with the agreement but regarded it as a great advance; and in the course of further discussion, Dr. FOTHERGILL said he had observed a great improvement during recent years in relations between private practitioners and medical officers of health.

The draft agreement was accepted by the meeting.

Motor Accidents.

Dr. J. W. BONE (chairman of the Medico-Politica Committee) said it had become a misfortune for a medical man to live near one of the great roads of this country. He had to work by day and by night with very little chance of payment and his lot was al the worse if he happened to be on the staff of the local hospital. All the same the Council felt tha it was not the function of a body of doctors to initiat a solution of this problem. He therefore moved:

That the Representative Body is of opinion that failing the creation of a central fund by some extra tax on motorist or some system of compulsory insurance, including a priority for charges for medical attendance on any claims made either of which methods would require legislation, probably highly contentious in nature, no satisfactory solution can be devised of the difficulty experienced by doctors in recovering the amount of their charges for treatmen rendered to patients meeting with accidents on the road further the Representative Body is of opinion that no greater case can be made out for dealing specially with th non-payment of fees incurred by persons involved in roa accidents, than for those incurred in the treatment of th victims of any other form of accident.

Dr. C. FORBES, for Aberdeen, produced argument against nearly all these contentions and proposed tha the question should be sent back for reconsideratio

* In classes 3 and 4 an increment of £50 to the salary every two years to 75 per cent. of commencing salary, provided that no salaries in these classes shall exceed £1100. In classes 5 and 6 it is understood that suitable increases for capability and length of service will be given.

This opinion got spirited support from Dr. J. B. MILLER, who said that Lanarkshire were astounded at the Council's recommendation—in so far as they could understand it. He thought the Council was "shelving the matter in an avalanche of words," and he drew a pathetic picture of the medical man summoned urgently to a motor accident—as often as not to find the smiling face of the countryside unchanged when he got there. Sometimes the patient removed himself; sometimes he was removed by another car; and in any case no doctor would think of attending accidents except from a sense of duty. At the end of the proceedings a constable would often emerge from cover, the reason for his previous modesty being that if he had sent for medical help himself the police would have been liable for a fee. Most motorists were insured against third-party risks. Why, then, should not the insurance company pay the doctor direct, just as (he understood) fire-brigades were paid direct for their salvage?

Dr. R. M. MANWARING-WHITE said he knew that in some areas the police had definite instructions not to send for a doctor so that they should not be liable for a fee; their custom was to ask Tom, Dick, or Harry in the crowd to send for help.

After a brisk discussion, Dr. BONE said he was now convinced that the question was worthy of the Council's further attention, and agreed that it might be desirable to get the views of the big motoring organisations. The resolution was therefore referred for reconsideration—a fate which also overtook the next of the Council's recommendations, namely:

That although it is unsatisfactory that fitness for driving a mechanically propelled vehicle should, as at present it is, be ignored entirely in the granting of a driving licence, the practical difficulties in regard to the position, including that of obtaining a consensus of opinion as to what the disabilities should be, are such that it is inadvisable for the Association at present to make a pronouncement in the matter; further, that no scheme in this respect so far proposed is free from great practical difficulties.

In trying to get the meeting to accept this motion Dr. BONE lucidly set out the practical difficulties with which, he said, the subject bristled, but Dr. FORBES remarked that these had been surmounted in other countries and Dr. DAIN thought the Association should be prepared for future legislation. Mr. BISHOP HARMAN suggested that an ad hoc committee should be set up to consider what, if any, standards of fitness for driving were desirable, and the meeting as a whole clearly favoured this course.

The Noise Nuisance.

An instance of the general desire to set many things right was provided by West Suffolk, who proposed that the Council be instructed to "take steps to secure legislation for the abatement of unnecessary noise." Dr. GRACE GRIFFITH admitted that West Suffolk was the quietest place on earth, but explained that its rural peace only served to emphasise the nerve-shattering noise now made by mechanical pig-feeders and similar devices. Why, she asked, were moving motors obliged to have silencers, whilst stationary oil-engines, from which there was no escape, could be as noisy as they liked? Could not offensive and unnecessary noise at least be scheduled as a nuisance under the Public Health Act? To which Dr. BONE replied that they had tried to do this last year, but Mr. Neville Chamberlain had astutely insisted on knowing just why noise was bad for health, and had eventually referred them to the Minister of Transport as a more appropriate authority. As for fresh legislation, said Dr. Bone, the Representative Body seemed to think its promotion was very easy; but really it was nothing of the kind. This time his plea was successful, and the meeting passed on to the next item on the agenda, which was the Council's new maternity scheme.

A National Maternity Service.

This scheme is intended to reduce maternal mortality and morbidity by ensuring adequate supervision before, during, and after confinement. It is based on the view that not more than 5 per cent. of women require admission to an institution on medical grounds, and it therefore provides for child-birth at home in all save complicated cases, and those needed at hospital for teaching students and midwives.

The midwife will be engaged early in pregnancy, and will thereafter keep the patient under observation. Not later than the thirty-sixth week she will arrange for one or more examinations by the doctor (chosen by the patient), who is to supervise the case, and if any abnormality arises before or during confinement she will call him in at once. The Council holds that the usual routine work of the antenatal centres can be done quite as well at the doctor's consulting room or in the patient's home—an arrangement which secures a continuity of supervision and treatment not at present obtained.

An essential part of the scheme is that medical men should be able to get their patients into institutions and "should, where possible, be allowed to treat those of them so admitted." Such institutions are to be paid for accommodation and nursing of these abnormal cases admitted on the practitioner's certificate, the cost to the service being estimated at £3 per bed for an average of three weeks for 5 per cent. of the total number of women delivered.

Arrangements are further outlined for a postnatal consultation in every case by the doctor, and for the fees of anæsthetists and consultants where these are called in. The proportion of patients who are likely to need the doctor's services during confinement is given as one in ten, payment being at the scale rate of 5*s*. per case now paid by local authorities. For each case the practitioner will further receive an average of 11*s*. 6*d*. for antenatal and 5*s*. for postnatal examination, whilst the midwife will probably get about £2 10*s*. for her services. The "handy woman" has no place in the proposals, but a "home help" will still be required and will usually be paid for out of maternity benefit under the Insurance Acts.

The scheme is intended to apply to all women now entitled to this benefit—i.e., insured women and the wives of insured men—together with other women of similar economic status. The estimated cost on an assumption of 500,000 deliveries per annum is about £2,022,000, which would be offset by the saving of the fees at present paid by the patients or on their behalf. It is suggested that the service should be provided on an insurance basis via the National Health Insurance machinery, and it is stated that an additional contribution on behalf of employer and worker together of 0·4*d*. per week for each insured person, with 0·2*d*. per week from the State, would provide all the money needed. For participants outside National Health Insurance the necessary premiums would be otherwise arranged.

A Brisk Discussion.

Dr. DAIN described the proposals as an attempt to reproduce throughout the country the essential features of maternity services which had shown excellent results in practice. Modern teaching favoured confinement in an institution, but the figures supplied by some of these services showed that labour could be conducted equally safely in the houses of the poor. The scheme permitted free choice of doctor and midwife; it provided that one medical man should see the patient through from start to finish; and it was cheap in the sense of being efficient and economical. It would improve the status of the midwife and encourage a better class of woman to take up this work, and it emphasised the importance of antenatal examination, to which some practitioners were not yet fully alive.

Dr. B. H. PAIN, for Tunbridge Wells, objected strongly to a note in the scheme which says that any woman who wants a doctor to attend her in normal labour must engage him at her own expense. No national scheme, he said, should prevent a woman having her own doctor in attendance. Moreover, the delegation of all normal childbirth to midwives meant that medical men could never acquire the experience necessary for the proper conduct of difficult cases. The proposals were simply proposals for endowing midwives and they would not attract a single medical

man to the practice of midwifery. He could have understood their being presented by the Central Midwives' Board or the Society of Medical Officers of Health; but to find them put forward by the B.M.A. was not only disappointing but disillusioning.

Dr. D. ROXBURGH traced the decline of midwifery to the passing of the Midwives Act. The wise practitioner no longer undertook confinements, for instead of having 100 cases a year—the rough with the smooth—he got ten difficult cases without any compensating change in the rate of payment.

Dr. JAMES YOUNG pointed out that at all events the maternal mortality-rate was not increasing, and spoke of the work of the Queen Victoria Jubilee Nursing Institute, which recorded a rate of only 1·3 to 1·5 per 1000—one-third of the average. He held that the proposed scheme provided in an unprecedented way for coöperation between doctor and midwife.

Dr. C. M. STEVENSON said it was true that the scheme did not benefit the profession financially, but that could not be helped. Midwives were taking over more and more of this branch of practice, and on the whole they could do more for their patients than a doctor could. It would be well to accept a scheme like this which at least gave medical men a share in the work.

In further discussion it was pointed out that a woman in childbirth has a right to ask for alleviation by anæsthetics and drugs which at present can be given only by medical men. More than one speaker said the profession must make up its mind whether it does or does not want to do midwifery. Advertisements of practices suggested that it did not; and it was no good to pass resolutions at the Representative Meeting if they were not going to be backed up at home when the night bell rang. Dr. BRACKENBURY said the object of the scheme was to make childbirth as safe as it could be made, but if it was proposed that a doctor as well as a midwife was to attend every confinement—or even every confinement in which the patient asked for a doctor—then the scheme would never be accepted by those responsible for the national finances. This argument was reinforced by Dr. DAIN'S remark that at the moment there is no public demand that a medical man should be available in every case. So long as the present maternity benefit was available he was satisfied that no injustice would be done to any woman who particularly wanted a doctor to attend her. He said that one of the merits of the scheme was that it had nothing to do with endowment of the profession, and that all along they had been looking at it from the point of view of the women who were to benefit.

With minor emendations the scheme was approved by the meeting.

The Maternal Mortality Inquiry.

A brief exchange of opinion on the reaction of practitioners to the questions of a departmental committee drew from one representative the epigram: "What is worth doing is worth being paid for, and what is not worth being paid for is not worth doing." But this was far from reflecting the spirit of the hour, and the following recommendation of Council was approved:—

That as the giving of information to the medical investigator who will fill up the form of inquiry issued by the Departmental Committee on Maternal Mortality is regarded by the Association as a voluntary contribution on the part of the medical profession to a scientific inquiry on a question of pressing public importance, the Association is of opinion that no fee should be charged for the service and none accepted if offered.

Psycho-analysis and its Critics.

Four years ago Dr. L. A. PARRY raised this subject because experience of certain unfortunate cases had persuaded him that psycho-analytical methods were capable of doing a great deal of harm, especially to young people. He asked the Association to issue a public warning against these dangers, and in 1926 a committee was appointed under the chairmanship of Dr. R. LANGDON-DOWN to investigate psycho-analysis in all its bearings. (When the report of this committee was issued last month we gave some account[1] of the findings and explained that the terms of reference were held to cover only the views and methods of Freud and his school.)

Dr. R. LANGDON-DOWN proposed that the report of the Committee on Psycho-analysis appointed in 1926, should be accepted as discharging their instructions. The Representative Body was prepared to agree with Dr. F. H. BODMAN'S opinion that in the course of wide reading he had never come across a fairer exposition of the subject. At the same time it listened sympathetically to Dr. PARRY'S objection that not enough stress was laid on the dangers he had in mind. He moved a resolution regretting "that more emphasis has not been laid [in the Report] on the very real and serious dangers, specially to children and adolescents, of any system of mental therapy which postulates a sexual basis as the sole or preponderating cause of nearly all neuroses and pathological mental conditions." As a member of the Committee during its four years' deliberations Dr. Parry declared himself more than ever convinced of the harm that might be done by psycho-analysis, which postulated, he said, that sex was at the bottom of almost all mental and nervous departures from the normal. The Freudians thought that head-nodding, thumb-sucking, and similar disorders were associated with the Œdipus complex, and to treat children on this basis must obviously put sexual thoughts and desires into their heads and thus promote objectionable conduct later on. Mr. E. B. TURNER warmly assented and told of the trouble he had had in "cleaning up the mess" in the minds of young people who had been psycho-analysed. He thought that perfectly healthy adolescents sometimes suffered both physical and mental damage by being encouraged to "think of things they had never dreamt of, and dream of things they had never thought of," and if he was told that those he had in mind had gone to the wrong kind of psycho-analyst—well, all he could say was that there were a lot of the wrong kind about. Similar views were evidently held by a considerable number of those present, many showing themselves suspicious of psycho-analysis, but after Dr. Parry's opening speech no time was lost before Dr. M. G. BIGGS, one of the senior members of the meeting, pointed out that in scientific discussion there should be no question of prejudice. A more detailed defence of the report was offered by Dr. R. G. GORDON, hon. secretary of the investigating committee, who admitted that harm had been done in the name of the method, but urged that this did not condemn it any more than antiseptic surgery was condemned by the errors of its earlier practitioners. Dr. Parry was not fair, he said, in stating that Freud and his followers "postulated" a sexual basis for nervous disorder. They did not; they said they *found* it—which was a very different thing. It was not the business of the committee to adjudicate on the dangers of psycho-analysis unless definite evidence was laid before them; none of the cases brought to their notice had supported the statements made by its opponents, and he doubted whether Mr. Turner's cases would hold water if properly criticised. This brought the sharp rejoinder from Dr. PARRY that it was almost impossible to prove damage in such a case, especially to a committee; "but suppose I hand a boy a tin of gunpowder and a match, must I produce his charred body before I am believed?" Dr. PARRY was again equal to the occasion when Dr. C. M. STEVENSON asked the meeting to stop its heresy-hunting and think of the verdict of posterity. If the theory was true it must be accepted, said Dr. PARRY; but was all criticism a heresy hunt? When the French Government 100 years ago set up a committee to investigate morphia, would they have shown intolerance in drawing attention to the dangers of this drug? As for the verdict of posterity, Dr. J. T. D'EWART pungently remarked that he was thinking not of posterity, but of his own patients and

[1] THE LANCET, July 6th, 1929, p. 31.

of how they were to be protected from psycho-analysts who were not properly trained. Whether or no the best practitioners of psycho-analysis were safe, there were people going about under the same flag who were undoubtedly a public danger here and now, quite apart from questions of posterity. A cognate view was taken by Dr. C. E. DOUGLAS, who objected to the widespread assumption that Freud had discovered the psychological influence of sex and had invented the subconscious mind. The difference between schools of thought on the subconscious was, he said, that James separated it from the conscious by a threshold which was clean, whereas the threshold recognised by Freud was covered with muddy foot-marks. Dr. DOUGLAS vigorously disapproved of certain aspects of the report, and this and other critical opposition to it might have carried the day but for opinions expressed by three of those who had served on the committee. Dr. PETER MACDONALD said that he was clear, at any rate, on two points: First that psycho-analysts (in the true and proper sense) were not charlatans, and secondly that "proof of the dangers of psycho-analysis appears to disappear when probed." After sitting on the committee for three years he did not *know* whether the method was dangerous to children and adolescents, but he was sure that the representatives ought to be in the same position and he begged them not to commit themselves to what Dr. D. CLOW called a pontifical announcement when they did not know, and they knew that they did not know. Dr. LANGDON-DOWN admitted that there must be dangers in any form of exploratory mental therapy, but thought that none had done more than the psycho-analysts themselves to point out these risks and guard against them. Lastly Dr. E. K. LE FLEMING, in giving further approbation to the report, wondered why no case of damage done could be produced if they were indeed so common.

It will be seen that woven among strong feelings about a practical problem there was in this discussion a very general desire to keep an open mind. After serving on the investigating committee Dr. LE FLEMING summarised his feelings in the quotation, "Oh what a dusty answer gets the soul, hotfoot for certainty in this our life"; but this was a negative attitude compared with that of Dr. J. S. MANSON and several other representatives who obviously (like Matilda's aunt) kept a strict regard for truth. With so many adorning the tale it fell, perhaps, to Dr. L. W. BATTEN to point the moral of greatest practical importance. The meeting was very nearly being asked, he said, to declare that nothing so unpleasant as psycho-analysis could possibly be true, and this was an attitude of mind concealing dreadful dangers. People who thought experiments on animals particularly unpleasant were apt to say that such experiments were therefore wrong, and that deductions from them must be unsound. Hence came the necessity to argue that staphylococci did not cause boils, or tubercle bacilli tuberculosis. "We must not do things like that," said Dr. BATTEN; and perhaps because they saw this hideous abyss in front of them the representatives by a large majority threw out Dr. PARRY'S resolution calling attention to the dangers of psycho-analysis. The Psycho-analysis Committee were thanked for their services without comment on the nature of the report.

Election of Chairman and Vice-Chairman.

Dr. HAWTHORNE was re-elected chairman of the Representative Body for the coming year, and Dr. ARNOLD LYNDON vice-chairman.

(To be concluded.)

RATING OF SUNDERLAND HOSPITALS.—Under the new scheme for the unification of rating, the assessment of Sunderland Royal Infirmary was increased to £700, while that of the Aged Seamen's and Widows' Homes at Bishopwearmouth was raised to a point which threatened their closure. The local assessment committee has now decided to rate the Infirmary and the Children's Hospital at the nominal figures of £15 and £5 respectively, with similar large reductions for the other institutions.

Correspondence.

"Audi alteram partem."

THE SCOPE OF CANCER INQUIRY.

To the Editor of THE LANCET.

SIR,—The report of the British Empire Cancer Campaign (summarised in your issue of July 13th) is, as usual, an admirable record of excellent work, but, if I may be allowed a criticism, it seems to me that progress in the investigation of the causation of cancer might be more rapid if the tacit assumption that cancer and sarcoma are different from all other kinds of tumour were dropped, and the scope of the inquiry were enlarged to embrace the mode of origin of all tumours.

Tumours start either from a single cell or from a group of cells which have the same origin, serve the same function, and live under the same conditions. For some reason as yet unknown, these cells at different stages of their development suddenly cease to do any work or to develop any farther, and instead devote the whole of their energy to indiscriminate multiplication. The cause is the sudden assertion of the power of asexual reproduction which is inherent in every cell, more or less in virtue of its descent, but which is kept under control, unable to exert itself so long as the cell continues to expend its energy in doing its own special work. The result is the formation of a growth with a life of its own, distinct from that of the parent that gave it birth, though absolutely dependent on it, drawing all the nourishment it requires from the parent, and doing nothing for it in return, capable of growing and thriving while the parent starves, and only dying when the supply of nourishment is cut off by some local cause, or by the death of the parent—in other words, what may be regarded as a parasite.

The germ cell, whether of the race or of the individual (which, in the course of its development, recapitulates the evolution of the race), possesses the power of growth and reproduction in its fullest measure. It can divide into two and each half can form a separate and perfect individual. Or the separation may be incomplete, or the division may be unequal, when some monstrosity will result. Every part of it possesses this power, and the earliest cells into which it divides inherit it, and can behave almost as independent organisms, capable of moving from one part to another. But as the cells continue to multiply, and the organism to increase in size, this stage of semi-independence comes to an end. Certain groups of cells become marked off by their position or relation to the rest as specially adapted to carry on certain kinds of work, and organs with definite functions begin to make their appearance. One of the earliest of these groups to be marked off in this way is that to which is assigned the function of reproduction and the preservation of the race.

At once the organism becomes divided into two parts, very unequal in size. One, the smaller of the two, is concerned solely with the function of reproduction and the preservation of the race. It does nothing else. It has no other kind of work, and as it is restricted to this one function, it becomes more and more efficient, until bisexual reproduction is evolved, and ultimately the sexes become separate. The tumours that grow from these cells are imperfect representations of organs or tissues, arranged, so far as circumstances permit, in a more or less orderly manner. Many of them are capable of a certain degree of development, and some can carry on a useless kind of work. The reproductive energy of the cells has been released in some way from the control that held it in check, and they are free and unfettered to develop as far as the influence of surrounding structures allows them.

The other, by far the larger of the two, has nothing to do with the preservation of the race, and is given up altogether to the maintenance of the individual. The cells of which it is composed undertake everything

that is necessary for this purpose. The work is of the most varied character, and their structural development, which is determined by the character of their work, is naturally equally varied. Little by little, as they become more and more highly specialised, the reproductive power which they originally possessed in common with their fellows grows less and less. Traces of it may be seen in larval forms, especially of aquatic animals in which the reproduction of limbs is still possible, and in a much more rudimentary form, even in mammalian embryos, but so far as the higher animals are concerned reproduction is limited to the formation of simple tissues, and even in these to those that are not too highly specialised. Structures such as the elements of the organs of the special senses or of the nervous system have lost all power of reproduction, and tumours formed from them are almost unknown.

As the reproductive power is limited in this way, the only tumours that can be formed by these tissues are composed of simple elements, without order, arrangement, or shape, other than is imposed upon them by surrounding structures. Their clinical character depends upon the stage of growth reached by the parent cell before its development came to an end. If it had reached, or almost reached, its final adult form, as for example in the case of fibrous tissue, the tumour is formed of similar adult tissue, and increases slowly in size, pushing surrounding structures to one side. But if on the other hand it was still in the embryonic stage, with all its primitive powers of multiplication and migration unimpaired (and myriads of such cells are constantly being produced throughout life), the tumour is composed of similar rapidly growing cells, capable of invading surrounding tissues and of being carried, partly actively, partly passively, to other regions of the body, where they can grow into tumours like the original one. As development is a continuous process without break or interruption from the very earliest age up to the perfection of specialisation, and this sudden arrest can apparently take place at any stage, the tumours that grow from these cells necessarily shade imperceptibly into each other, and no line of separation can be drawn between them, no matter how much they may differ from each other clinically. Characteristic types can be, and must be, described, around which the majority of these growths can be ranged, but in between these there are numberless gradations of which no one can say whether they belong to one or the other, or whether they may not belong at one time to the one and at another to the other. The distinction is a clinical one.

The simultaneous occurrence of these three phenomena which appear to be essential to the growth of tumours—viz., the cessation of all functional activity, the arrest of development at whatever stage the parent cell may have reached, and the output of all the reproductive energy it still retains, must be associated with, if not caused by, a profound change in the metabolism of the cell. But the agent that can bring about this change is still unknown. Mechanical irritation undoubtedly plays a part, for tumours develop most frequently in places exposed to irritation, but it is open to question whether it is sufficient by itself. Information is more definite about chemical substances such as soot, some forms of tar, and mineral oils, especially when their action is long-continued and associated with irritation. There is no doubt as to what they can do. Very possibly the occurrence of tumours of the bladder in those engaged in aniline dye works, and the development of epitheliomas in cases of unrelieved congenital phimosis are instances of purely chemical action. X rays, which can kill cancer cells and are at the same time the most certain agent for producing cancer known, must act by influencing the metabolism of the cells exposed to them. The first change is an interference with the function of the skin. It becomes dry and harsh. Then the development of the epidermic cells becomes imperfect. Little irregularities appear upon the surface. Definite warts and papillomata follow, and if exposure is continued epithelioma is certain. That these and certain chemical substances are capable of effecting changes in cell metabolism cannot be denied, but as yet too little is known to allow even speculation upon the nature of these changes. Hope seems to point in the direction of tissue culture, and it is not impossible that the problem of the causation of cancer will ultimately be solved by the study of the conditions that influence the function of reproduction.

I am, Sir, yours faithfully,

C. MANSELL MOULLIN, C.B.E., M.D., F.R.C.S.

July 21st, 1929.

THE DEVELOPMENT OF PULMONARY TUBERCULOSIS.

To the Editor of THE LANCET.

SIR,—Dr. Morlock's valuable paper in your issue of July 13th and Dr. Toussaint's letter in the following issue draw attention to the simulation of influenza by incipient phthisis. Radiology has, indeed, placed beyond dispute the statement that the onset of pulmonary tuberculosis, especially in young persons, is usually an acute process. It is therefore not surprising that the earliest manifestations of the disease are often lightly dismissed by the patient and occasionally by the doctor as the effects of an "influenzal cold" or "chill." Mistakes of this kind are indeed inevitable unless the possibility of tuberculosis is kept constantly in mind. The results may be disastrous alike to the doctor's reputation and to the patient's chances of recovery.

Inquiries as to the first symptons of disease in a series of 50 adolescent and young adult female consumptives who came under my observation in the period 1927–28 gave the following results: Cough (accompanied by lassitude in nearly half the cases) 64 per cent.; haemoptysis, 18 per cent.; influenza, chill, 12 per cent. During the winter rush it is impossible for many practitioners to examine carefully every patient complaining of cough. I think, however, that mistakes in diagnosis might be reduced to a minimum in the busiest urban practice if the following points were remembered:—

1. Cough in a young person, especially in one of the female sex, should always be regarded as a possible danger signal. If persisting for more than a week the spit should be tested for tubercle bacilli. If the result is negative and symptoms continue the test should be repeated on at least two further occasions.

2. A hæmoptysis of one teaspoonful or more should be regarded as evidence of tuberculosis unless other cause can be demonstrated. The only other common cause of pulmonary hæmorrhage in young persons is bronchiectasis. A hæmoptysis which the patient seeks to minimise is almost always of sinister import, one that a patient delights to describe is seldom of any great significance.

3. In physical examination auscultation is more important than percussion—despite the text-books. Moist râles in the upper half of the lung should be regarded as presumptive evidence of tubercle. Dry crackles or superficial rustles should be disregarded. A crepitation is a sound heard not a sound imagined. The common site of early infiltration, as Dr. Morlock has emphasised, is below the clavicle, where in a typical case the skiagram shows a roughly triangular shadow with its base outwards towards the axilla. The infraclavicular and axillary regions should therefore be auscultated with special care, as also the region internal to the vertebral border of the scapula which includes the *zone d'alarme*. If the patient is instructed to give a short cough and take a breath every time the stethoscope is applied the whole chest can be auscultated in a couple of minutes.

The average practitioner cannot command radiograms of the fine quality necessary for chest work, and though a skiagram is always valuable and sometimes essential for correct diagnosis, a poor film is worse than useless. Temperature, pulse, and weight records are obviously desirable but not always obtainable. If, however, due regard were always paid to the criteria indicated above, very few cases of incipient tuberculosis should be missed. A history of possible exposure to infection is not likely to be ignored by the family doctor.—I am, Sir, yours faithfully,

W. BURTON WOOD.

Park-square West, N.W., July 21st, 1929.

THE MEDICAL DIRECTORY.

To the Editor of THE LANCET.

SIR,—The annual circular has been posted to each member of the medical profession. If the form has not been received, a duplicate will be sent on request. We shall be grateful for the return of the forms by an early post.—We are, Sir, yours faithfully,

J. AND A. CHURCHILL.

40, Gloucester-place, W.1, July 18th, 1929.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

LOCAL GOVERNMENT (SCOTLAND) ACT AMENDMENT BILL.

REPLYING to Mr. BALDWIN (Leader of the Opposition) in the House of Commons on Wednesday, July 17th,

Mr. MACDONALD, Prime Minister, said that the Local Government (Scotland) Act Amendment Bill was circulated for the information of the House so that they might see what was best to be done in the circumstances, and he had made it clear that unless there was some chance of getting the Bill through Parliament within a reasonable time it would be quite impossible to proceed with the measure. He wished to have an opportunity to pursue his investigations further in order to see whether it would be possible to proceed with the Bill, and he promised to make a final statement as to its fate on the following day.

On Thursday, July 18th, in reply to Sir ARCHIBALD SINCLAIR,

Mr. MACDONALD said that he had made further inquiries about the chances of the Bill in relation to the business which must be finished this month. He had also had representations of both sides of Scottish opinion. With very much regret he saw no prospect of this Bill passing all its stages in this House and in the House of Lords in time to be effective, and, therefore, he did not propose to ask the House to discuss the measure further.

Miss LEE asked if there was any insurmountable reason why the House should not sit a little longer to consider this Bill. Profound disappointment, and indeed indignation, would be caused in Scotland if it was dropped at this stage, especially as many members on the Labour benches felt that they had a full assurance in that House that this matter would, above all others, be given consideration before the summer recess.

Mr. DUNCAN MILLAR: Is it not the case that on Wednesday last the Prime Minister gave this House an undertaking that he was going to save the education portion of the Bill, and is the right hon. gentleman aware that his action will cause great disappointment to the authorities and the people in Scotland who were relying on what the right hon. gentleman had said?

Mr. MACDONALD said that the description of what he had said in the previous week was most inaccurate. He said exactly the opposite. What the Government had to face was whether the Bill could be got through in time.

Mr. MACPHERSON: Are we to understand from my right hon. friend that there will be no further inquiry into Scottish local self-government, or into Scottish local government?

Mr. MACDONALD: That part of my statement (which was a definite statement) remains.

Sir A. SINCLAIR: If the inquiry is going to take place in October, surely it will be a *post mortem*?

Mr. MACDONALD: In any event, four-fifths will be.

Mr. HARDIE: Is the Prime Minister aware that this was a major subject at the General Election?

Mr. MACDONALD said that at the General Election he had stated that there was a possibility of education being separated from the rest of the Act, but that he was not sure and would look into it, and if anything could be done a Labour Government would do it. He had made it clear that, as far as the Act itself was concerned, it could not be annulled or changed, but as regarded the whole of the altered Scottish local government machinery the Labour Party, if it had the enjoyment of power during a full Parliament, would certainly before going to the country complete the inquiries on the subject and take action.

Mr. MACPHERSON asked leave to move the adjournment of the House for the purpose of discussing a definite matter of urgent public importance—namely, "the failure of the Government to suspend the operation of the Local Government (Scotland) Act, 1929, or to proceed with its Bill to amend the said Act."

Fewer than the requisite 40 members intimated their support of Mr. Macpherson's request, and the House therefore proceeded to the Business of the Day.

COLONIAL DEVELOPMENT BILL.

On Wednesday, July 17th, Mr. LUNN, Under Secretary for the Colonies, in moving the second reading of the Colonial Development Bill (a measure to enable the State to grant financial assistance to schemes of development overseas with a view to helping employment in this country), said that when the financial resolution on which the Bill was based was being discussed several speakers had raised the question of medical services, and had urged that they should be considered in any scheme of colonial development. There had been many schemes undertaken not only in this country but by other countries in recent years on which that matter had been considered very seriously, and taken in hand, and they had proved the wisdom of giving attention to the health conditions of those who laboured in these great enterprises. It was equally important that health conditions should be considered even in smaller enterprises. He could assure the House that in any schemes of colonial development the medical services and medical research for the improvement of health conditions would find a very important place.

Lord EUSTACE PERCY said that the Lord Privy Seal and the Under Secretary for the Colonies had both laid stress on the grants for health purposes. These grants, if they were to be permissible under the Bill, would be so under the words "any other means" in Section 1. If they mentioned "any other means" and specified one of those other means, "including surveys," they ran great risks of finding that health would be excluded. That was a Committee point, but he would ask the Government to give their attention to it.

Sir OSWALD MOSLEY, Chancellor of the Duchy of Lancaster, said that quite clearly under the wording of the Bill animal health was included, because anything relating to agriculture concerned animal health, and therefore animals were within the purview of the measure. He thought that Lord Eustace Percy, however, had referred to human diseases. He (Sir O. Mosley) was advised that within the framework of the Bill it was possible to include diseases affecting those engaged in industry and which impaired their efficiency. Certainly such diseases as hookworm, which notably impaired the efficiency of those engaged in industry, could be dealt with under the Bill. In fact, whenever they came to the consideration of industrial efficiency they must at once be led to the physical condition of those engaged in the industry, and it would be a very narrow and very mistaken reading of the purposes of the Bill if the great human element upon which, after all, all industrial efficiency rested in the first degree, was excluded from its purview.

Dr. VERNON DAVIES: Why not include it specifically?

Sir O. MOSLEY said that he had been trying to explain that it was included.

Dr. VERNON DAVIES: With great respect to the hon. baronet, I do not agree with him.

Sir O. MOSLEY said that after the explanation he had given he could only assure Dr. Davies that his fears were not justified.

The Bill was read a second time.

On Thursday, July 18th, the House went into Committee on the Colonial Development Bill, Mr. R. YOUNG in the chair.

Power to Make Advances for the Purposes of Colonial Development.

On Clause 1, Dr. MORGAN moved an amendment to make it clear that schemes for benefiting health or labour conditions were included under the clause. He said that on the second reading debate Sir O. Mosley had stated that he thought that health matters were included in the Bill. The word "health" was not mentioned in the whole of the Bill. Health was a very important subject in the Crown Colonies, and especially in the West Indian Islands. The only possible reference in the Bill which could be included under health was the question of the drainage of land and swamps for the removal of malarial conditions. The disposal of sewage in many of these islands was very primitive at present, and he wanted to make it possible for sewage schemes to be brought within the scope of the measure, as such schemes affected tourist traffic, trade, and the general health of the community. He also wanted to make sure that if a company started a new industry, or to develop an old one, such company should provide proper housing and working conditions for the people engaged in the industry.

Sir O. MOSLEY said that since the second reading debate he had looked closely into the question of whether this matter was covered by the Bill. The impression which he had already stated to the House was confirmed, and he was satisfied that health was included. He was quite prepared, however, if hon. Members desired it, to consider the inclusion of specific words at a later stage to cover this point.

Dr. MORGAN withdrew his amendment.

Later Sir O. MOSLEY moved to include the words "the promotion of public health" in the clause. He said that

indigenous inhabitants would be covered by the words of his amendment, as well as all forms of settlers, and he hoped that hon. Members on both sides of the House would be satisfied that it definitely established the principle of public health.

The amendment was agreed to.

The Committee stage of the Bill was concluded.

THE HOUSING SUBSIDY.

The Housing (Revision of Contributions) Bill was read a second time.

On Monday, July 22nd, Mr. A. GREENWOOD, Minister of Health, in moving the third reading of the Housing (Revision of Contributions) Bill said that it was a modest measure which proposed merely to continue for the present the existing housing subsidy under the 1924 Act and to discontinue, as the late Government suggested, the subsidy under the Act of 1923. He said that he had been criticised by Sir Kingsley Wood for not having done more. He had not done more because he was primarily concerned to avoid discontinuity of building and to give the Government time to produce a Bill of a much larger kind. The prolongation of the subsidy under the 1924 Act did not prejudice in any way what might happen in the future. If he could get local authorities, as he understood he could, to continue their building pending a larger measure, then he would consider this Bill had been amply justified.

Mr. T. SNOWDEN said he took exception to the speech of Lieut.-Colonel Fremantle in which he said that medical officers of health urged as strongly as they could that the Treasury should reduce the vast sums which were spent by the late Government on housing in order to provide more money for other important health services which were calling out for treatment. He (Mr. Snowden) regretted to hear that speech, because if the subsidy would encourage housing—and he believed it would—it would remove evils caused by bad houses and in consequence reduce possible expenditure on the other matters to which Colonel Fremantle had referred.

Lieut.-Colonel FREMANTLE: I only said that it was an extremely extravagant way of doing it.

Mr. SNOWDEN said that it was rank waste to have to spend so much money on evils which were caused directly by bad housing. It was better to spend money on housing than have to spend it on building hospitals.

Lieut.-Colonel FREMANTLE: The whole point is waste. So far as it goes to improving housing we are all in favour of it.

Mr. SNOWDEN said he differed from Colonel Fremantle and he would like to think that the hon. Member did not represent the views of other medical officers of health, or even of the medical profession.

Miss RATHBONE urged that after the lapse of ten years a Select Committee was needed to consider the housing problem from the tenancy side, to see how far they could erect enough houses and to see that those houses passed into the hands of those whose housing needs were the sorest. At present the housing policy of this country might be compared to our having built at vast cost a reservoir intended to relieve the thirst of people who were dying of thirst and then allowing the first call on the water to go to those who wanted water only for the watering of their roses. The problem of incapacity to pay an economic rent was a personal problem and could never be solved, whatever the subsidy might be, by so mechanical a device as a flat-rate arithmetical equal reduction of rent by the amount of the subsidy upon the houses built by the local authorities.

Dr. VERNON DAVIES said that Mr. Chamberlain, the late Minister of Health, as a result of his prolonged experience, came to the conclusion that a subsidy had a distinct effect on the cost of houses; that if the subsidy was raised there was a tendency for the cost to rise, and, on the other hand, if the subsidy was reduced there was a tendency for the cost of houses to be reduced. The present Minister of Health took exactly the opposite view. Although the Minister would not deny that subsidies might have some effect upon prices he was not concerned so much with the matter of prices as with the building of houses as quickly as possible. That helped the building of houses, but it did not help to let them at an economic rent which people could afford to pay. He (Dr. Davies) would suggest that the Minister of Health had a sufficient amount of information to enable the House to come to a considered opinion on the subject, and when the scheme which was germinating in Mr. Greenwood's brain came before the House next session it might be well if a White Paper was laid before Parliament giving the whole arguments for and against a subsidy, what it had done in the past, and what it was expected to do in the future. If the Minister of Health was right in his theory it would be to his great advantage and to the advantage of the country. If, on the other hand, the argument pointed in the other direction he was sure that Mr. Greenwood was a big enough man to acknowledge it. His (Dr. Davies's) belief up to the present time was that Mr. Chamberlain was right in his theory, and that the Government were making a grave mistake.

The Bill was read the third time and passed.

HOUSE OF LORDS.

TUESDAY, JULY 23RD.

The Problem of Slum Clearance.

Lord ARNOLD, Paymaster-General, moved the second reading of the Housing (Revision of Contributions) Bill. He said that it was a temporary measure. The whole question of housing and slum clearance was receiving the constant and earnest attention of the Government. In due course their plans would be made known.

The Earl of ONSLOW said that the Bill was a mischievous and retrograde measure.

The Bishop of SOUTHWARK said that the problem of slum clearance had never really been tackled. It never would be tackled until a large number of new houses, at low rents, were built within reach of their occupants' work. If the problem was to be solved they would be driven back on the policy of giving special children's allowances for rent. Any scheme for dealing with the slums would cost large sums of money, but when the conditions under which the people lived were realised it would be felt that almost any expenditure was worth while. A recent survey of housing conditions in Southwark, by competent and experienced investigators, showed that the condition of affairs was horrible. In street after street they found people living under conditions of darkness, dampness, and overcrowding. Sometimes a man, his wife and his children would be found living in a basement which had long since been condemned as unfit for human habitation. The investigators quoted the fact that the Medical Officer of Health for Southwark had stated that in one year there were 10,000 houses in Southwark which were not in a reasonably fit state in all respects for human habitation. The matter, the Bishop of Southwark continued, was far too large for any borough or Medical Officer of Health or any individual to deal with; it must be tackled by the nation as a whole. He was glad that the Government had decided not to reduce the present subsidy. The present Bill would give the Government time to prepare their plans for a measure dealing with the slums which, he hoped, would be comprehensive and courageous.

The Bill was read a second time.

HOUSE OF COMMONS.

WEDNESDAY, JULY 17TH.

Medical Service in Tristan da Cunha.

Mr. SCURR asked the Under Secretary for the Colonies how often the island of Tristan da Cunha was visited officially; what arrangements were made to meet any emergency medical or other call from the inhabitants; and if there was a wireless station on the island.—Mr. LUNN replied: There is no regular programme of visits to Tristan da Cunha. His Majesty's Government, however, have endeavoured to arrange that at least one steamer carrying supplies, &c., calls at the island each year. On learning in April last of a threatened food shortage, His Majesty's Government provided the funds necessary to ensure the call at Tristan of a vessel carrying relief stores. I understand that a wireless apparatus, capable of receiving messages from England, Buenos Ayres, and New York, was installed on the island last February.

Prohibition of Night Baking.

Mr. MANDER asked the Home Secretary whether it was the intention of the Government to include in the forthcoming Factories Act a clause prohibiting night baking.—Mr. CLYNES replied: This question will be considered by the Government in connexion with the Factories Bill, but I am not at present in a position to make any statement.

Private Mental Hospitals.

Mr. SORENSEN asked the Minister of Health how many private lunatic asylums and mental hospitals existed in England and Wales; the number of patients therein, and the number of discharges therefrom during last year.—Miss SUSAN LAWRENCE (Parliamentary Secretary to the Ministry of Health) replied: On Jan. 1st, 1929, there were 69 private institutions under the Lunacy Act, and 4649 patients therein. There were 742 discharges during 1928.

Use of White Lead Paint.

Mr. MANDER asked the Home Secretary if the Government were prepared to ratify the International Labour Office Convention, 1921, concerning the use of white lead in painting.—Mr. CLYNES replied: Ratification would have to be

preceded by legislation for the amendment of the present law, and all I can say on the subject at the present moment is that it will be considered with other questions in connexion with the proposed Factories Bill.

THURSDAY, JULY 18TH.

Pensions Medical Officers.

Dr. MORGAN asked the Minister of Pensions the total number of medical practitioners now employed by the Ministry on a sessional basis, and how many of these were specialists.—Mr. ROBERTS replied: The number of medical officers employed by the Ministry on a sessional basis was, during the latest period for which information is available, on an average 363, of whom approximately two-thirds were specialists.

Treatment Allowances in Tuberculosis Cases.

Mr. SIMMONS asked the Minister of Pensions whether he would reverse the present practice regarding tuberculosis cases, whereby ex-Service men who were knocked off work by the pensions doctor were not granted treatment allowances until they entered an institution, by ordering that the payment of such allowances should date from the day of relinquishing work under the advice of a pensions doctor.—Mr. ROBERTS replied: My hon. friend is, I think, under a misapprehension. In any case where the Ministry's medical adviser considers it desirable, in the interests of treatment which has been recommended, that a man should abstain from work pending admission to an institution, it has always been the practice to pay treatment allowances in the interval, subject to the usual conditions.

Pensions Final Awards.

Dr. MORGAN asked the Minister of Pensions the total number of final awards made in the half-year ending June 30th last; the total number of pensioners now receiving final award pensions; the number of such cases who had appealed for re-assessment in the last two years; and whether he would consider application for review if such cases were now submitted to him.—Mr. ROBERTS replied: The total number of final awards made in the six months ending June 30th last was 24,677. The number of pensioners now receiving final awards of life pension is about 390,000. During the past two years 7529 appeals have been made to the Assessment Appeal Tribunals. The arrangements which I was enabled to make five years ago for the correction of serious errors of final award are still in operation.

Unqualified Nurses in Mental Hospitals.

Mr. AYLES asked the Minister of Pensions the number of unqualified nurses at present employed in the mental hospitals under his control; and whether he would take an early opportunity to see that only certificated male nurses were employed in State institutions.—Mr. ROBERTS replied: The male nursing staff employed in institutions dealing with cases of mental and severe nervous disorder is required, to the utmost extent possible, to be qualified by experience in the handling of such cases, and 25 out of the 62 male nurses employed in nursing *certified* cases have the additional qualification of a certificate. With regard to the second part of the question, I understand that the Board of Control have not found it practicable or desirable to advise in public mental hospitals the standard suggested by my hon. friend.

Asylum Workers' Superannuation.

Mr. RAMSBOTHAM asked the Minister of Health whether, in view of the need for the coördination of superannuation of officials both in asylums and mental deficiency institutions as well as in the mental wards of poor-law institutions, and as these would in the main in future come under the same control, he would consider the desirability of ensuring that no superannuation provisions should militate against free interchange of qualified mental nurses between one type of institution and another.—Mr. GREENWOOD replied: I will consider the question raised by the hon. Member in connexion with any proposed legislation amending the relevant Superannuation Acts.

Mental Defectives.

Mr. SORENSEN asked the Minister of Health to state the ascertained number of mental defectives under and above 16 years of age, respectively, in England and Wales, and the number of each category in suitable institutions; and whether he proposed to take steps to ensure the provision of adequate accommodation for these persons.—Mr. GREENWOOD replied: The total number of mental defectives ascertained by local authorities was 66,458 on Jan. 1st last. Of these 19,138 were maintained in institutions. I regret that the available statistics do not enable me to differentiate between those under and those over 16 years of age, but the total given does not include feeble-minded children for whom the local education authorities are responsible. The problem of ensuring the provision of adequate accommodation is receiving constant attention.

Water Shortage.

Mr. LONGBOTTOM asked the Minister of Health if his attention had been called to the serious shortage in water-supplies; and what steps he proposed to take to temporarily amend the regulations regarding compensation water to riparian owners so that local authorities might be helped to overcome their difficulties during this time of emergency.—Mr. GREENWOOD replied: My attention has been drawn to this matter. In the memorandum on water shortage which I have issued this week, I have advised that, where shortage exists or is threatened, and compensation water is supplied, the water undertakers should enter into immediate negotiations with the riparian interests with the object of securing agreement for the temporary reduction or intermission of discharges of compensation water. I trust that all interests will recognise that in the present exceptional emergency, essential domestic needs must have the first consideration, and that reasonable concessions immediately may be the only way to avoid a very serious situation within a short time.

Street Noises and Public Health.

Mr. FREEMAN asked the Minister of Health whether he was aware of the increase of street noises, particularly in London, caused mainly by traffic, inflicting considerable suffering, and being a general menace to health; and what steps, if any, he proposed to take to abate the nuisance.—Mr. MORRISON (Minister of Transport) replied: This matter was considered by a conference convened by my predecessor in October, 1928, and as a result of the recommendations contained in their report, the Motor Car (Excessive Noise) Regulations were made on June 3rd, and will come into operation on August 1st.

League Maternity Convention.

Mr. R. S. YOUNG asked the Secretary of State for Foreign Affairs if he would, at an early date, ratify the League of Nations maternity convention, which had already been ratified by nine European nations.—Miss BONDFIELD (Minister of Labour) replied: I have been asked to reply. As regards this and other International Labour Conventions which have not been ratified, it is proposed to examine each of them in the light of the existing law and practice in this country, and it is not possible as yet for me to say what action may be decided upon in any particular case.

Deposit Contributors and Insurance Benefits.

Sir CHARLES CAYZER asked the Minister of Health whether his attention had been called to the position of deposit contributors to the national health insurance, and to the fact that these contributors could not receive dental or optical treatment, while in the cases of those who had been rejected by an approved society through no fault of their own, and often as a result of war service, they needed such assistance more than the ordinary members of the community; and whether he proposed to consider the general improvement of their condition.—Mr. GREENWOOD replied: The position of deposit contributors as regards title to benefits under the National Health Insurance Acts is as stated by the hon. Member. Deposit contributors who can show that they were unable by reason of ill-health to secure admission to an approved society are now, however, entitled to receive the ordinary benefits without limitation to the amount standing to their individual credit, and I consider that the guaranteeing of these benefits is the best method of meeting the needs of this class of insured persons out of the limited funds available. Men discharged in ill-health from the forces of the Crown can be admitted to the Navy, Army, and Air Force Insurance Fund, and become entitled, in addition to the ordinary benefits, to dental and ophthalmic benefits free of cost.

Small-pox Hospitals.

Mr. BEAUMONT asked the Minister of Health if he would state in which counties there were small-pox hospitals; what provision was made for dealing with small-pox outbreaks in counties which had no such hospitals; and whether it was the policy of the Ministry to encourage county small-pox hospitals as the best and most economical method of dealing with outbreaks.—Mr. GREENWOOD replied: Small-pox hospital accommodation has been provided in every county with the exception of two in England and one in Wales. In these three counties arrangements have been made for the treatment of such cases of small-pox as may occur in hospitals situated in adjoining counties. With modern means of transport there are undoubted advantages in providing small-pox hospitals to serve wide areas, and for this purpose it is often convenient that the accommodation should be provided by the county council.

Venereal Disease Clinics.

Dr. MORGAN asked the Minister of Health the total number of venereal diseases clinics at present in Great Britain and the number administered by municipalities; the total

number of new cases since Jan. 1st last, and the total number of attendances; and whether he was considering an extension and more adequate facilities for such treatment in the near future.—Mr. GREENWOOD replied: The total number of venereal diseases clinics approved by my department in England and Wales is now 188, of which 60 are administered directly by local authorities. No information is at present available in regard to the second part of the question, but during the year 1928 the total number of new cases dealt with at these clinics was 85,908, of whom 27,597 were found not to be suffering from venereal disease, and the total number of attendances of patients was 2,422,749. A number of proposals for the provision of new clinics, or for the extension and improvement of the present facilities for treatment, have been approved or are now under consideration.

Panel Practitioners' Prescriptions.

Mr. REMER asked the Minister of Health if his attention had been called to the prescribing of Dr. Tomlinson, of Dukinfield, and Dr. Cooper, of Altrincham; if he was aware that the Cheshire insurance committee, representing 260,000 insured people, were unanimously of the opinion that the penalties imposed by the Ministry were harsh and punitive, and likely to result in a lowering of the standard of medical benefit of insured persons; and would he state the reasons for overruling the decision of the Cheshire insurance committee.—Mr. GREENWOOD replied: I am aware of the facts in these cases, which were decided in December last, and of the views of the insurance committee on the decisions. The decisions, which rest with the Minister and not with the committee, were taken because he was satisfied that the doctors had imposed charges upon the available funds in excess of what was reasonably necessary for adequate treatment.

Phototherapy and Light Treatment.

Mr. HARRIS asked the Minister of Health whether his department had had any inquiry into the subject of phototherapy; whether he had any information as to the proof of actual physical benefits in curing to the recipient of artificial light treatment as administered by the ultra-violet lamp; and whether he would consider holding an inquiry into the efficacy of light treatment generally, especially in welfare centres.—Mr. GREENWOOD replied: Special inquiries have been made during recent years by medical officers of my department into the application of phototherapy (including artificial light) to the treatment of disease, and the results have been published in the annual reports of the chief medical officer. These observations are being continued, and I do not see any necessity for a further inquiry. As regards the second part of the question, I am advised that the best results of this form of treatment appear to have been obtained in cases of rickets and of certain forms of non-pulmonary tuberculosis.

Health of Women Teachers.

Commander SOUTHBY asked the President of the Board of Education whether he was aware that the number of women teachers who broke down in health every year between the ages of 55 and 60 was increasing; and if he would consider the introduction of a scheme whereby women teachers could be granted optional retirement to begin at the age of 55.—Sir CHARLES TREVELYAN replied: The figures in my possession do not suggest that there is any substantial increase in the number of women teachers who break down in health between the ages of 55 and 60. Provision for such cases is already made in the Teachers (Superannuation) Act, 1925, and I cannot undertake to initiate legislation to provide for optional retirement on pension at an age less than 60.

Disturbances at Antivivisection Meeting.

Mr. DAY asked the Home Secretary whether he had now received the report from the Commissioner of Police upon the incidents which happened with regard to the disturbances at the meeting of the British Union for the Abolition of Vivisection at Caxton Hall on June 20th; whether he had considered this report; and could he now make a statement upon it.—Mr. CLYNES replied: I have now received a report from the Commissioner of Police regarding the meeting in question. The duty of police who may be present at public meetings is to prevent so far as possible any breach of the peace, and no special instructions were required or given on this occasion. It must be recognised that the task of the officer in charge in such cases is often a difficult one, as precipitate action is just as likely to provoke complaint as undue delay. The Commissioner of Police is satisfied, however, after considering a large number of statements made by persons who were present, that the officer in charge of the detachments sent to this meeting committed an error of judgment in not acting sooner. The Commissioner has taken appropriate action in respect to the officer concerned, and has communicated fully with the Union named in the question.

Industrial Diseases.

Mr. MORLEY asked the Home Secretary if his attention had been called to cases of chronic fibrosis of the lungs contracted through inhaling coal dust whilst working in ships' bunkers; and if he would consider the desirability of placing this complaint on the schedule of diseases coming within the scope of the Workmen's Compensation Act.—Mr. CLYNES replied: No such cases have as yet been brought to my notice, but if any cases have come to the knowledge of the hon. Member and he will furnish me with particulars of them, I shall be glad to have the matter investigated.

Mr. PHILIP OLIVER asked the Home Secretary whether he would consider the making of an order extending the provisions of the Workmen's Compensation Acts dealing with industrial diseases to the disease of cancer of the bladder as affecting workers in aniline factories.—Mr. CLYNES replied: An order can only be made in respect of a disease which is due to the nature of the employment, and I am advised that it has not yet been definitely established that cancer of the bladder is caused by employment in aniline works. The matter is at present the subject of a research by the London Cancer Hospital, and I will consider whether any steps can be taken by my department to facilitate this investigation.

FRIDAY, JULY 19TH.

Artificial Silk Factories and Public Health.

Mr. KELLY asked the Minister of Health what complaints had been received by his department as to injury to the health of people residing in the neighbourhood of artificial silk factories.—Mr. GREENWOOD replied: I have received a number of complaints. I would refer my hon. friend to the report by the chief alkali inspector of my department on the emission of fumes from artificial silk works which was published in January last.

Conservation of National Water-supplies.

Mr. AYLES asked the Minister of Health whether, in view of the growing shortage of water and the need for conserving the national water supplies, he would have a survey made of the actual and potential supplies of the country as a whole, with a view to their effective organisation and use.—Mr. GREENWOOD replied: A survey of potential supplies would involve a great amount of detailed investigation and would by itself be of doubtful value. The most practical course is the formation of more advisory regional water committees on the lines advocated in the booklet issued by my department last October. By means of these committees not only the available supplies, but also the needs, of all the districts in the region can be ascertained and a definite policy recommended for meeting requirements over a long period. The findings of these committees can then be coördinated in the general interests, and a national policy formulated.

MONDAY, JULY 22ND.

Methyl Chloride in Refrigerators.

Commander BELLAIRS asked the Minister of Health whether he was aware that refrigerators were in use in this country using methyl chloride; and, in view of the danger to life, if any action was to be taken to prevent its use.—Mr. SHORT, Under-Secretary to the Home Office, replied: I am aware that methyl chloride is used in a number of these machines, but I have no evidence at present in my possession which would justify interference with its use. I understand that it is the practice of the makers to issue instructions with these machines, and so far as I have been able to ascertain these instructions have proved sufficient. If, however, the hon. and gallant Member has any information to the contrary, my right hon. friend will be glad to consider it.

Accommodation of Civil Service Staffs.

Mr. WILLIAM BROWN asked the First Commissioner of Works whether he was aware that certain staffs in the Office of Works and the Ministry of Health were obliged to work in sub-basements and basements much below ground level and lit in the main by artificial light; that it was now proposed also to put Board of Trade staffs in these basements, and that the chief medical officer of the Ministry of Health had reported adversely on the use of these basements for this purpose; and whether he would provide alternative accommodation and so avoid the employment of the staff under these conditions.—Mr. LANSBURY replied: A small number of the staff work, during part of the day only, in the sub-basement, which is lit by artificial light. Other staffs work in the basement courts which enjoy good natural light, and it is proposed to utilise other similar courts for Board of Trade staffs. I am informed that the chief medical officer of the Ministry of Health has not reported adversely on the use of the basement, but, on the contrary, this officer and an officer of the Medical Research Council reported that, subject to the execution of certain works, the basement courts were quite suitable for occupation by

clerical staffs. Effect has been given to the recommendations of these officers. Under ordinary circumstances I should prefer that all staffs worked above the ground level, but at present we have no other available accommodation. My hon. friend may be assured that everything possible has been done, and will continue to be done, to keep offices as light, airy and healthy as possible.

Opium in India.

Mr. CECIL WILSON asked the Secretary for India whether all the committees appointed in the autumn of 1927 by five provincial governments to inquire into the high consumption of opium in certain areas had presented their reports; whether the local government which arranged to make a similar inquiry had presented its report; what action the government of India had taken or proposes to take upon the reports; when reports not yet presented might be expected; and whether all the reports were to be published.—Mr. BENN replied: Four of the six inquiries have been completed. As soon as the remaining two are finished the government of India propose to convene a conference to collate and compare the results obtained before the local governments pass orders. The publication of each report is a matter for the local government concerned. The Bengal report has been published.

TUESDAY, JULY 23RD.

Sterilisation of Mental Deficients.

Commander BELLAIRS asked the Minister of Health whether his department had full information as to the success of measures for the sterilisation of mental deficients in Switzerland, the United States of America, and other countries; and, if not, whether he would appoint a committee to investigate the matter and the increase of this class throughout the country.—Mr. GREENWOOD replied: The department has certain information regarding the sterilisation of mental defectives in other countries; but the measures in some countries have been introduced so recently, or applied on so limited a scale, that the data at present available do not warrant any deductions from them. I am not in a position to indicate at present whether it will be practicable to initiate an investigation on the questions to which the hon. Member refers.

New Water-supply Schemes.

Sir GEORGE PENNY asked the Lord Privy Seal whether he would consider the desirability of approaching local authorities in areas likely to suffer from water shortage in the event of drought to suggest schemes for the provision of catchment areas and reservoirs, which besides proving of great utility would provide work for the unemployed.—Mr. THOMAS replied: My right hon. friend, the Minister of Health, has recently drawn the attention of local authorities to the necessity of initiating schemes for new water-supplies in advance of requirements and has emphasised the advantages of regional water committees. Approved schemes of the character indicated would be subject to the appropriate unemployment grant.

Food Council and Milk Prices.

Mr. WISE asked the President of the Board of Trade what action was being taken by the Food Council in view of the 80 to 100 per cent. margin for distribution as compared with the farmers' price, in the scheme now under consideration for fixing milk prices by the National Farmers' Union and the milk distributing interests.—Mr. W. GRAHAM replied: I understand that the Food Council will have this matter under examination at their meeting to-morrow, and I have asked them for a report.

Chemical Warfare.

Brigadier-General CLIFTON BROWN asked the Secretary for War whether the War Office had ceased all work on chemical warfare; and if he had any information as to whether similar action had been taken by America, Germany, Italy, France, or Russia.—Mr. T. SHAW replied: His Majesty's Government have declared their intention of ratifying the Geneva Gas Protocol at an early date. In the meantime no change has been made by a departure from the research work which has been for a long time in progress. It is understood that similar research work is being carried on in the countries referred to.

Closing of Unfit Dwellings in Scotland.

Dr. FORGAN asked the Secretary for Scotland whether he was aware that the closure of houses in Elderslie, Thornliebank, Neilston, and elsewhere in the county of Renfrew, represented by the medical officer of health as unfit for human habitation, is being held up by legal difficulties, and that houses which had been made the subject of closing orders were still occupied; and what steps he proposed to take to remedy these matters.—Mr. ADAMSON replied: The answer to the first and second paragraphs of the question is in the affirmative. As regards the last part I understand that out of 51 tenants affected by closing orders in the area referred to by my hon. friend, 13 have not obeyed an order to quit. In view of the poverty of these 13 tenants no proceedings for recovery of the penalty imposed by the statute have been taken. I am in consultation with the Lord Advocate as to the steps that should be taken.

Hours of Work of Juveniles.

Mr. GRAHAM WHITE asked the Home Secretary whether he had in contemplation the introduction of legislation to regulate the hours of work of juveniles in occpuations in which such hours of work were at present unregulated.—Mr. SHORT, Under Secretary to the Home Office, replied: My right hon. friend has been looking into this matter and he hopes to bring proposals before Parliament, but is not able to make a more definite statement at present.

Children and Bovine Tuberculosis.

Lieut.-Colonel FREMANTLE asked the Minister of Health if he was aware that over 2000 infants died every year from bovine tuberculosis; that this was mainly conveyed by milk; that the expenditure on treatment, convalescence, and after-care of this disease in infants amounted to over £9,000,000 a year; and if he would consider the advisability of introducing measures to secure that no milk other than that free from tubercle should be given to infants attending the 3000 infant welfare centres.—Miss SUSAN LAWRENCE replied: I am not aware from what source the hon. Member obtained the figures mentioned in the first part of the question. My right hon. friend is advised that it is not possible to ascertain precisely how many infants die each year from bovine tuberculosis, but such evidence as is available suggests that the number is less than that given in the question. The answer to the second part of the question is in the affirmative. I am not aware of any information to support the figure of £9,000,000 a year mentioned in the third part of the question. As regards the last part, dried milk is supplied at the majority of infant welfare centres, and this is recommended by my department in any case in which the ordinary milk supply is of doubtful quality. A few local authorities supply tuberculin tested milk, but it would not be practicable to require such a supply in every case nor would such a requirement be justified having regard to the many available supplies of dried milk of reliable brands.

Medical News.

UNIVERSITY OF OXFORD.—At a congregation held on July 21st, the following degrees were conferred:—

D.M.—F. J. Bach, New College.

B.M.—J. C. Nicholson, New College; and W. J. Walter, Brasenose.

UNIVERSITY OF CAMBRIDGE.—At a congregation held on July 20th the following degrees were conferred:—

M.D.—E. A. B. Pritchard, W. R. F. Collis, and R. A. McCance.

M.B., B.Chir.—G. E. Lewis, F. H. McCay, C. L. Stote, C. E. Woodrow, R. W. Windle, and D. M. Stern.

M.B.—P. B. Kittel.

B.Chir.—Sagarajasekaran Tyagaraja, F. Bush, C. P. Campion, F. W. J. Wood, and C. J. Grosch.

SOCIETY OF APOTHECARIES OF LONDON.—At recent examinations the following candidates passed in the subjects indicated:—

Surgery.—C. E. P. Davies, Guy's Hosp.; W. M. Hamer, Manchester and Charing Cross Hosp.; A. Hamid, Middlesex Hosp.; C. Hortop, Guy's Hosp.; V. J. Lopez, St. Mary's Hosp.; W. McDermott, London Hosp.; K. M. Seedat, Charing Cross Hosp.; V. J. C. Vandenbosch, Louvain; and T. K. White, Bristol.

Medicine.—A. Campbell, Edinburgh; V. N. Vatta, London Hosp.; A. N. De Monte, St. Mary's Hosp.; C. Parthasarthe, Birmingham; C. F. H. Quick, St. Mary's Hosp.; P. U. Rao, Charing Cross Hosp.; and A. Somerville, Sheffield.

Forensic Medicine.—V. N. Datta, London Hosp.; E. T. Garthwaite, St. Bart.'s Hosp.; J. Gordon, St. Mary's Hosp.; C. Parthasarthe, Birmingham; C. J. Poh, Edinburgh; C. F. H. Quick, St. Mary's Hosp.; and P. U. Rao, Charing Cross Hosp.

Midwifery.—A. R. Edwards, Liverpool; R. W. Goldsbrough, Leeds; P. D. Kapur, Glasgow; E. Marks, St. Mary's Hosp.; C. J. Poh, Edinburgh; S. V. S. Rao, Madras; T. G. Robinson, Guy's Hosp.; and G. W. Sturgess, St. Bart.'s Hosp.

The Diploma of the Society was granted to the following candidates, entitling them to practise medicine, surgery and midwifery: A. Campbell, V. N. Datta, C. J. Poh, C. F. H. Quick, P. U. Rao, and K. M. Seedat.

UNIVERSITY OF LONDON.—Prof. H. H. Woollard, M.D., B.S. (Melbourne), has been appointed from Sept. 1st, 1929, to the University Chair of Anatomy tenable at St. Bartholomew's Hospital Medical College. He was educated at the University of Melbourne and at University College, London. He served during the war, being mentioned in despatches, and awarded the Croix de Guerre avec palme for his services, and from 1919–23 was senior demonstrator and from 1923–27 assistant professor of anatomy at University College, London. He has held a Fellowship under the Rockefeller Foundation, and has obtained the Symington prize for anatomical research. Since 1927 he has been professor of anatomy in the University of Adelaide.

The University Studentship in Physiology for 1929–30 (value £100) has been awarded to Miss Margaret Hill, B.Sc.

Dr. E. Graham Little has been elected chairman of the Council for External Students.

At recent examinations the following candidates were successful:—

M.S. EXAMINATION.

Branch I., *Surgery.*—Ralph Brooke, Guy's Hosp.; H. I. Deitch, Middlesex Hosp.; and J. R. M. Whigham, St. Mary's Hosp.

Branch IV., *Oto-Rhino-Laryngology.*—S. A. Beards, London Hosp.; and Mildred Warde (University Medal), London (R.F.H.) Sch. of Med. for Women.

M.D. EXAMINATION.

Branch I., *Medicine.*—A. R. Balmain, Univ. of Birmingham and Middlesex Hosp.; Samuel Berman, Guy's Hosp.; M. H. C. Dyson and L. I. Henzell, Univ. Coll. Hosp.; J. C. Hoyle (University Medal), Univ. of Manchester; R. H. Knight, St. Bart.'s Hosp.; Lucy M. T. Masterman, London (R.F.H.) Sch. of Med. for Women and St. Mary's Hosp.; S. K. Montgomery, Univ. Coll. Hosp.; Thomas Robson, St. Thomas's Hosp. K. S. Smith, Middlesex Hosp.; R. G. R. West, St. Bart.'s Hosp.; and Katharine G. L. Williams, London (R.F.H.) Sch. of Med. for Women.

Branch IV., *Midwifery and Diseases of Women.*—Elaine Œnone H. Earengey, Univ. Coll. Hosp.; Phyliss V. L. Epps, and Dorothy E. Stewart, London (R.F.H.) Sch. of Med. for Women.

Branch V., *State Medicine.*—W. E. Snell, Univ. Coll. Hosp.

Branch VI., *Tropical Medicine.*—J. A. Carmen, London Hosp. and London Sch. of Hyg. and Trop. Med.

DIPLOMA IN PSYCHOLOGY.

Winifred C. P. Abraham, Bedford Coll.; Doris I. Huband, King's Coll.; Dorothy M. Lemerle, Univ. Coll.; Norah K. Satow, King's Coll.; Ethel K. Taylor Bedford Coll.; S. E. W. Taylor, London School of Economics; Clara P. Thomson and Ellen M. Walford, King's Coll.; and W. R. Watson, Univ. Coll.

DIPLOMA IN BACTERIOLOGY.

Robert McC. Burnie, R. D. Mackenzie, R. S. Marshall, and A. F. B. Standfast, London Sch. of Hyg. and Trop. Med.

UNIVERSITY OF MANCHESTER.—The following awards have been made: Sheridan Delépine Fellowship in Preventive Medicine: Lois Stent. Robert Platt Physiological Scholarship: Eli Davis. Dr. Robert Angus Smith Scholarship in Sanitary Science: Rupert Lyth. Prof. Tom Jones Exhibition in Anatomy: J. F. Heslop. Entrance Scholarship in Medicine: G. Israëls and W. C. Barber. Sidney Renshaw Prize in Physiology: C. H. Gray. Turner Medical Prize: Donal Sheehan. Dumville Surgical Prize: Donal Sheehan. Wild Prize in Pharmacology: E. D. Portman.

UNIVERSITY OF EDINBURGH.—At a graduation ceremonial on July 17th the following degrees and diplomas were conferred:—

M.D.—*G. G. Allan, *H. M. Anderson, †J. M. Bassett (*in absentia*), ‡G. I. Boyd, E. H. Brindle, †W. R. D. Fairbairn, *G. B. Flint, Alice J. Gray, J. W. Hunter, ‡C. F. W. Illingworth, *J. B. King, Shena Macvicar (*in absentia*), R. J. Matthews, W. J. F. Mayne, *K. T. Moir, J. R. Murdoch, A. M. W. Rae, ‡C. M. Seward, Alice B. S. Smith, and Florence L. Telfer.

* Commended for thesis. † Highly commended for thesis.
‡ Awarded gold medal for thesis.

M.B., Ch.B.—R. D. Aitken, Deborah M. Alcock (*in absentia*), D. M. Alston, L. W. Banks, R. F. Barbour, H. S. A. Bishop, ‖T. P. Bliss, W. J. Brandon, K. M. Brower, J. A. Burgess, J. A. P. Cameron, A. F. K. Clarkson, E. A. Cormack, Mary E. Crowley, Timothy Crowley, J. A. Cuthbert, W. S. Dalgetty, J. M. Davidson, S. C. M. Downing, E. F. J. Dunlop, T. J. Eason, M. A. B. Fenton, John Fletcher, J. M. Fosbrooke, D. A. Fowler, Donald Fraser, J. A. Gemmel, ‖W. H. Gillespie, Kamel Girgis, ‖E. L. Godfrey, George Graham-Cumming, G. M. Greig, Alexander Haddow, Robert Hardy, ‖Robert Harkness, David Harley, R. A. K. Harper, ‖C. P. Hay, Winnifred N. Henderson, Emma L. Howard, J. M. Howie, Jean M. Huggins, William Irvine, ‖James Laurie, J. L. Law, L. R. Levy, D. K. L. Lindsay, Joyce M. Lister, Sydney Livingstone, G. A. Macarthur, R. P. A. Macaulay, ‖I. C. Macdonald, J. P. M'Gibbon, D. J. M. MacKenzie, Margaret B. M'Laren, Dileas Maclean, Archibald Macmillan, Joan K. Macpherson, A. G. G. Melville, J. B. Methven, A. A. Miller, Jean M. Milne, A. St. J. Moffat, Clement Muir, J. M. Muir, William Murray, Helen R. Neve, W. E. Orchard, D. S. Patton, J. R. H. Peat, Samuel Pinkinsky, L. T. Pollard, J. R. M. Read, A. I. Rosenthal, R. A. T. Rouse, R. M. Saleh, ‖Agnes Y. Savage, Walter Schlapp, V. V. Schoeman, J. M. Scott, Agnes D. Sloan, D. A. Smith, W. H. M. Smith, Richard de Soldenhoff, Bernard Stein, W. A. R. Thomson (*in absentia*). A. I. L. Turnbull, A. B. Wallace, E. J. G. Wallace, H. J. Weir, Mary M. A. Whittet, J. L. Wilkie, W. E. Willis, Jessie R. Wilson, and J. F. A. Wood.

‖ Honours.

Diploma in Radiology. — G. C. Field, A. J. G. Mackay M. J. S. Pillai, Sher Singh, Elizabeth Thompson (*all in absentia*).

The following awards of fellowships, scholarships, and prizes have been made:—

The Cameron Prize in Practical Therapeutics has been awarded to Lieut.-Colonel Sir Leonard Rogers, F.R.S., in recognition of the discoveries he has made in the treatment of several tropical diseases, and in particular in the treatment of Cholera, Amœbic Dysentery and Leprosy.

Thesis Gold Medallists: Dr. G. I. Boyd, Dr. C. F. W. Illingworth, and Dr. C. M. Seward. Ettles Scholarship and Leslie Gold Medal: Dr. James Laurie. Gunning Victoria Jubilee Prize in Chemistry: Mr. R. W. Armour, Ph.D. Allan Fellowship in Clinical Medicine and Clinical Surgery: Dr. C. P. Hay. Murchison Memorial Scholarship in Clinical Medicine: Dr. I. G. W. Hill. M'Cosh Graduate's and Medical Bursaries: Dr. R. M'K. Honey. Mouat Scholarship in the Practice of Physic: Dr. Robert Harkness. Buchanan Scholarship in Midwifery and Gynæcology: Dr. James Laurie. James Scott Scholarship in Midwifery: Dr. E. L. Godfrey. Beaney Prize in Anatomy and Surgery: Dr. E. L. Godfrey. Conan Doyle Prize: Dr. R. D. Aitken. Annandale Gold Medal in Clinical Surgery: Dr. R. F. Barbour. Murdock Brown Silver Medal in Clinical Medicine: Dr. C. P. Hay. Royal Victoria Hospital Tuberculosis Trust Gold Medal: Dr. A. G. G. Melville. Scottish Association for Medical Education of Women Prize: Dr. Agnes Y. Savage. Dorothy Gilfillan Memorial Prize: Dr. Agnes Y. Savage. Wightman Prize in Clinical Medicine: Dr. R. D. Aitken. Pattison Prize in Clinical Surgery: Dr. J. A. P. Cameron and Dr. R. A. T. Rouse (equal). Cunningham Memorial Medal and Prize in Anatomy: C. A. Green. Whiteside Bruce Bursary: Mr. Alexander Brown.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH.—A quarterly meeting was held on July 16th, the President, Dr. Robert A. Fleming, being in the chair. Dr. G. S. Brook, Dr. F. W. Woolrabe, Dr. A. Rae Gilchrist, and Dr. Rutherford Dow were introduced and took their seats as Fellows of the College. Dr. F. T. Bowerbank and Dr. W. T. Munro were elected Fellows of the College. Dr. S. A. Kinnier Wilson had been appointed Morison Lecturer for 1930.

ROYAL COLLEGE OF SURGEONS OF EDINBURGH.—The following candidates have passed the final professional examination for the diploma of L.D.S.:—

W. C. Craig, R. T. Amour, A. A. McNish, J. D. Johnstone and J. N. K. Clarkson.

Pathology, Medicine, and Surgery.—W. P. Neilson.

Dental Subjects.—W. A. E. Duncan and G. M. S. McGibbon.

DONATIONS AND BEQUESTS.—Among other bequests the late Mr. John Hughes, of The Lache, Clifton Park, Birkenhead, left £1000 to the Birkenhead and Wirral Children's Hospital for a John Stanley Hughes Cot Fund; and £1000 to the Birkenhead and Borough Hospital, of which the income is to be applied for the maintenance of the hospital.—The late Mrs. Caroline Tremlett, of Highlands, Exeter, left £500 each to the Royal Devon and Exeter Hospital, the Convalescent Home, Exmouth, and the Institution for the Blind, St. David's Hill, Exeter, as well as other charitable bequests.

BRITISH SOCIAL HYGIENE COUNCIL.—The Summer School, the fourth of its kind, which is in session at Westminster College, Cambridge, remains open until Thursday, August 1st. Social problems affecting standards of sex conduct are being considered in relation to the biological sciences; on the preventive side the protective education of young people in industry and the special problem of the adolescent unemployed, the coöperation between parent and teacher in the training of children, come under discussion. Dr. F. A. E. Crew, professor of animal genetics at the University of Edinburgh, is giving a course of six lectures on Biology and Human Affairs, and Col. P. S. Lelean, professor of public health at the same University, a course on Public Health and Social Hygiene. Evening meetings to be followed by discussion will be addressed by Dr. I. Feldman, Miss V. D. Swaisland, B.Sc., Sir Basil Blackett, Mrs. C. Neville Rolfe, and Mr. P. G. Cam ray, director of Messrs. Stanley Jay, Ltd. A course in evolutionary biology, with special reference to work in school classes, with practical work, will be given under the supervision of Dr. E. Watkin at the West Riding of Yorkshire Education Committee's Summer School at Bingley from July 31st to August 14th.

NAVAL MEDICAL COMPASSIONATE FUND.—At the quarterly meeting of the directors, held on 3rd July, Surgeon Vice-Admiral Arthur Gaskell, C.B., Medical Director General of the Navy, in the chair, the sum of £40 was distributed to the only applicant.

NEW WING TO HITCHIN HOSPITAL.—On Saturday last the Duchess of York opened a new wing of the North Hertfordshire and South Bedfordshire Hospital at Hitchin. Since the war £35,000 has been spent on the enlargement and the development of the institution, and the new wing has cost £7000.

EAST SUSSEX HOSPITAL.—A new children's ward in the Royal East Sussex Hospital at Hastings has been opened by Lord Rothermere, who marked the occasion by a gift of 2000 guineas. The ward is the gift of Mrs. Whitefoord, of Battle, in memory of her son, Esmond.

LONDON FOOT HOSPITAL.—This institution has just moved into new quarters in Fitzroy-square, and an appeal is being made for £12,800 to free it from debt. Last year free treatment was given to over 12,000 patients, and Sir A. Henry McMahon, the chairman, states that the number could be doubled this year if more money were available.

POST-GRADUATE COURSE IN ORTHOPÆDIC SURGERY..—A special two weeks' course will be held at the Royal National Orthopædic Hospital from Nov. 18th to 30th. Lectures and demonstrations will be given and those taking the course will have access to operations and the practice of the hospital. Application should be made to the Secretary of the hospital, or to the Secretary, Fellowship of Medicine, 1, Wimpole-street, London, W.1.

MEDICAL TOUR IN CZECHO-SLOVAKIA.—A tour of the principal towns of Czecho-Slovakia has been arranged between Sept. 8th and Sept. 17th, 1929. The party will meet at Eger on Sept. 8th and will proceed to Franzensbad, Marienbad, Carlsbad, Jachymov, and Prague, where a stay of two days will be made. Macocha and Pistiany will then be visited and the party will reach Vienna on Sept. 17th. Further particulars and a detailed programme can be obtained from the organisers of the tour, Mon Voyage Société de Voyages Internationaux, 9, Rue de la Michodière, Paris, 2°.

METROPOLITAN ASYLUMS BOARD.—Dr. E. W. Todd, D.P.H., has been appointed bacteriologist at the antitoxin establishment of the Board at the Belmont laboratories, Sutton, Surrey, of which Dr. R. G. White is the director. Dr. Todd is at present research assistant in the inoculation department, St. Mary's Hospital, a position which he has held since January, 1924, and has had eight years' experience in pathological work, including a Rockefeller Medical Fellowship held at the Rockefeller Institute in 1927–28.

ENLARGEMENT OF STORNOWAY HOSPITAL.—Mrs. Macaulay, of Montreal, Canada, recently opened a new wing of the Lewis Hospital, Stornoway. The wing, which consists of two maternity wards, with accommodation for nurses, has been given by her husband, Mr. T. B. Macaulay, President of the Sun Life Assurance Co. of Canada, who has endowed the hospital with the sum of £16,000. The endowment fund has just been increased by a gift of £3000 from Mr. John Bain, of Chicago, a brother of the Provost of Stornoway.

BIRMINGHAM HOSPITALS' CONTRIBUTORY SCHEME.—The remarkable success of this scheme grows progressively. Since it came into operation in January, 1928, it has paid £165,000 to the Birmingham hospitals, nursing societies, and kindred institutions; there are 270,000 members employed by 4400 firms, 2500 of which add 25 per cent. to the amounts contributed at their works.

A "SUNSHINE" CONVALESCENT HOME.—Recently Prince George opened the first wing of a new Children's "Sunshine" Convalescent Home at Shoeburyness.

MOTORING AND EXCESSIVE NOISE.—The regulations prohibiting excessive noise in the use of motor cars, of which notice was given by the Minister of Transport on June 3rd, are to come into force next Thursday, Aug. 1st. These regulations make it an offence for any person to use, or permit to be used, a motor car, or a trailer drawn by a motor car, which causes any excessive noise as a result of any defect in design or construction, or lack of repair or faulty adjustment. It is also an offence under the regulations to use a vehicle or trailer which makes an excessive noise due to the faulty packing or adjustment of the load.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, London, W.

ALL SAINTS' HOSPITAL, Vauxhall Bridge-road, S.W. SPECIAL COURSE IN UROLOGY, Afternoons and Evenings, duration of course one month from July 29th. Further information from the Fellowship of Medicine.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.

MONDAY, July 29th.—2.30 to 5 P.M.: Medical, Surgical and Gynæcological Clinics. Operations.

TUESDAY.—2.30 to 5 P.M.: Medical, Surgical, Ear, Nose and Throat Clinics. Operations.

WEDNESDAY.—2.30 to 5 P.M.: Medical, Skin, and Eye Clinics. Operations.

THURSDAY, August 1st.—11.30 A.M.: Dental Clinics. 2.30 to 5 P.M.: Medical, Surgical, Nose, Throat, and Ear Clinics. Operations.

FRIDAY.—10.30 A.M.: Throat, Nose and Ear Clinics. 2.30 to 5 P.M.: Surgical, Medical, and Children's Diseases Clinics. Operations.

Appointments.

FLETCHER, T., M.B., Ch.B. Glasg., has been appointed Surgeon under the Factory and Workshop Acts for Kirkcowan, Wigtown.

Vacancies.

For further information refer to the advertisement columns.

Aberdeen, County of, P.H. Dept.—Jun. Asst. M.O.H. £500.
Barnsley, Beckett Hospital and Dispensary.—Jun. H.S. £140.
Birkenhead General Hospital.—Cas. S. £100.
Birmingham and Midland Eye Hospital, Church-street.—Res. Surg. O. Also Two H.S.'s. £150 and £110 respectively.
Birmingham Children's Hospital.—Res. M.O., £175.
Bradford Children's Hospital.—H.S. Also H.P. Each £120.
Brighton, Royal Sussex County Hospital.—H.S. £150.
Cairo, Egyptian University.—Prof. of Clinical Pathology. £E.1500.
Colonial Medical Services.—Vacancies.
Coventry and Warwickshire Hospital.—Res. H.S. £125.
Croydon Mental Hospital, Upper Warlingham.—Second Asst. M.O. £350.
Exeter, Royal Devon and Exeter Hospital.—Asst. H.S. At rate of £100.
GlasgowRoyal Cancer Hospital.—Pathologist. £400—£500.
Great Yarmouth General Hospital.—Sen. H.S. £150.
Hertfordshire County Council.—Two School Dentists. Each £500.
Huddersfield Royal Infirmary.—Jun. H.S., at rate of £150.
Hull Royal Infirmary.—Cas. H.S. At rate of £130.
Ilford Emergency Hospital.—Sen. and Jun. H.S.'s.
Indian Medical Service.—Commissions.
Infants Hospital, Vincent-square, Westminster, S.W.—H.P. at rate of £75.
Ipswich, East Suffolk and Ipswich Hospital.—H.S. At rate of £120.
Liverpool, Alder Hey Children's Hospital, West Derby.—Res. Asst. M.O. £200.
Liverpool and District Hospital for Diseases of the Heart.—H.P. At rate of 50 guineas.
Liverpool County Borough.—Jun. Asst. School M.O. £600.
Liverpool Open Air Hospital for Children, Leasowe.—Jun. Res. M.O. At rate of £200.
London Female Lock Hospital, 283, Harrow-road, W.—H.S. At rate of £150.
London Temperance Hospital, Hampstead-road, N.W.—Cas. O. At rate of £120.
Longton Hospital, Stoke-on-Trent.—H.S. £120.
Lowestoft and North Suffolk Hospital.—H.S. £120.
Manchester, Ancoats Hospital.—Orthopædic H.S. Also H.P. Each at rate of £100.
Manchester Royal Infirmary.—Jun. Asst. M.O. for Radiological Dept., £350. Also Jun. H.S. £100.
Miller General Hospital, Greenwich-road, S.E.—Hon. P. to Skin Dept. Also Cas. O. At rate of £150.
Nottingham City Education Committee.—Sen. Asst. School M.O. £600.
Oldham Royal Infirmary.—Three H.S.'s. Each at rate of £75.
Philadelphia, Hospital of the Women's Medical College.—Hospital Resident.

Plymouth, City and Port of.—Asst. M.O.H. £600.
Plymouth, Udal Torre Sanatorium, Yelverton.—Res. M.O. £450.
Preston and County of Lancaster, Queen Victoria Royal Infirmary. H.S. £150.
Queen Mary's Hospital for the East End.—Hon. Asst. Radiologist.
Radcliffe-on-Trent, Notts County Mental Hospital.—Sen. Asst. M.O., &c. £520.
Rotherham, County Borough of.—Deputy M.O.H., &c. £650.
St. John's Hospital, Lewisham, S.E.—Res. House Appointment, £100.
Salisbury General Infirmary.—Res. H.P. £150.
Salisbury Municipality, S. Rhodesia.—M.O.H. £900.
Sheffield Royal Hospital.—Ophthalmic H.S. At rate of £80.
Sheffield Royal Infirmary.—Surg. Reg. £200. Also Asst. Cas. O. H.S., Ophth. H.S., and Asst. Ophth. H.S. Each at rate of £80.
University College Hospital, Gower-street, W.C.—Asst. Radiologist. £200.
Warrington Infirmary and Dispensary.—3rd Resident. At rate of £150.
Woolwich and District War Memorial Hospital, Shooters' Hill, S.E.—Jun. H.S. At rate of £125.
Worcester General Hospital.—Sen. and Jun. Res. M.O.'s. £180 and £120. respectively.

The Chief Inspector of Factories announces vacancies for Certifying Factory Surgeons at Banchory (Kincardineshire), Chipping Sodbury (Gloucestershire), at Harlow (Essex), and at Colwyn Bay (Denbighshire).

Births, Marriages, and Deaths.

BIRTHS.

ENNION.—On July 16th, at Harlech House, Burwell, the wife of Dr. E. A. R. Ennion, of a daughter.

FRANKLIN.—On July 15th, at Banbury-road, Oxford, the wife of Dr. K. J. Franklin, of a daughter.

HARVEY-KELLY.—On July 17th, at Clonhugh, Co. Westmeath, to Sybil Harvey-Kelly, M.B., B.S., D.P.H., wife of Lieut.-Colonel Charles Harvey-Kelly, D.S.O.—a daughter.

KITCAT.—On July 16th, the wife of Dr. C. de Winton Kitcat, St. Leonards-on-Sea, of a son.

REYNOLDS.—On July 18th, at Aldershot, the wife of Major W. L. E. Reynolds, M.C., R.A.M.C., of a daughter.

WALLACE.—On July 16th, at Murrayfield, Horsham, Sussex, the wife of John Hugh Wallace, L.D.S., of a son.

MARRIAGES.

ABBOT-ANDERSON—PORTER.—On July 17th, at the Parish Church, St. Michael the Archangel, Lyme Regis, Dorset, William Maurice Abbot-Anderson, C.V.O., M.B., B.S., to Muriel Violet, only daughter of the late Mr. Percy Charles Porter and Mrs. Porter, of Abercorn-place, N.W.

BOWERS—BAKER.—On July 16th, at Holy Trinity Church, Brompton, Captain George Percy Farmar Bowers, I.M.S., to Winsome Mary Bassett, younger daughter of the late Mr. and Mrs. Frank Edwin Baker, of Northampton.

OSBORNE—HALL.—On July 17th, at St. Nicolas and St. Faith, Saltash, Surgeon-Lieutenant L. B. Osborne, R.N., of Bexhill, to Marie Kenley Hall, of Saltash, Cornwall.

DEATHS.

BEALE.—On July 12th, at Roman Tower, Broadstone, Dorset, Hanway Richard Beale, M.D. (Lond.), M.B., M.R.C.S., L.R.C.P., D.P.H. (Sheffield), of Bridgegate House, Retford, Notts.

JOHNSON.—On July 17th, at Church-road, Hove, Sydney Perrins Johnson, L.D.S., R.C.S., Ireland, in his 74th year.

PARKER.—On July 15th, at Thames View Cottage, Flackwell Heath, Bucks, George Dines Parker, M.R.C.S., L.R.C.P., M.B. Lond., aged 64.

WHITTON.—On Friday, July 19th, at a nursing home, Aberdeen, Dr. Alfred Bell Whitton, Towie House, Turriff, and late of Aberchirder.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

THE LANCET: SUBSCRIPTION RATES.

INLAND	One Year	£2 2 0
	Six Months	1 1 0
	Three Months	0 10 6
ABROAD	One Year	2 10 0
	Six Months	1 5 0
	Three Months	0 12 6

Notes, Comments, and Abstracts.

FOUR MILLENNIUMS OF CHINESE MEDICINE.

BY K. C. WONG.

PART II.—THE HISTORICAL OR CLASSICAL PERIOD (*continued*).

Three Great Pioneers.

CHINESE medicine begins properly in the Han Dynasty and its scientific advancement centres in the figures of Tsang Kung, Chang Chung-King, and Hua To—three of the greatest Chinese doctors of China. Tsang Kung, who lived about 170 B.C., was the first to record personal observations of clinical cases; a detailed list is extant of a group of his case-histories, revealing the medical philosophy of the time Of the 25 cases he has left on record—almost the only record of its kind for the next 1500 years—ten are reported as fatal. Tsang Kung was modest, for he admitted that his prognosis was not always accurate and that he could not cure any disease unless the pulse indications were favourable. He kept his case-notes for a double purpose—to estimate the percentage of failures and successes and to guide him in future predictions. The case-histories are not to be compared with those of Hippocrates—indeed, they are not of much scientific value, and after Tsang Kung this practice of taking clinical case-histories died out until the Sung Dynasty, when it was resumed fervently, and, of course, continues to be the method of the present time.

Chang Chung-King, the greatest of the trio, was also a doctor of literature. Little is known of his life except that about A.D. 195 he was Mayor of Changsha for some time, but he is often spoken of as the Chinese Hippocrates and is venerated as a sage. His fame rests chiefly on his work upon typhoid fever, which is one of the medical classics, ranking with Huan Ti's Canon of Medicine in importance. It was the first book of the kind in Chinese, but does not, as the title implies, deal with typhoid only, but with other fevers as well. In it are found 113 prescriptions, scientifically written, and containing only a few potent drugs, instead of being the "shot gun" formulæ of later practice, containing perhaps a dozen inert ingredients. Chang Chung-King was perhaps the first to employ enema to evacuate the bowels, and his antipyretic treatment of fever by cold baths antedates James Currie's method by 1700 years. Treatment which was chiefly confined to acupuncture, moxa, massage, and the administration of draughts and medical writings which were entirely philosophical, underwent change with the advent of Chang Chung-King. A new era was inaugurated and diseases were studied from a clinical standpoint, emphasis being laid on the physical signs, the symptoms, and the course of an illness; the methods of treatment and the action of drugs were studied rather than the theories of disease. Chang Chung-King stands above the crowd not only on account of his keen powers of observation but also because of his lofty ideals. He gave to the profession of medicine a high conception of its dignity and mission. But after his death scientific medicine degenerated again into dogmatic formalism, and no writings of any value or originality appeared until the Sung Dynasty, a gap of nearly one thousand years.

The last of the trio, and a contemporary of Chang Chung-King, was Hua To, the most famous surgeon of China. To him is usually attributed the discovery of anæsthetics, though Pien Chiao is credited with having employed it about four hundred years before him. It is said that he administered to his patients an effervescing powder in wine which produced complete unconsciousness, and that he performed all sorts of operations ranging from venesection and acupuncture to laparotomy, excision of the spleen, and various operations on the intestines and liver. A pioneer of hydrotherapy, he was also an exponent of systematic exercise and invented a system called the "frolics of the five animals." Most of the nobles of that period were his patients. Among them was Kwang Kung, a famous general, now deified as the god of war, on whom he operated without an anæsthetic for a poisoned arrow wound of the arm. King Tso Tso was another of his patrons. Hua To offered to cure the King's headaches by opening the skull under hashish. Accordingly he was arrested, thrown into prison, and later was executed. Just before his death he offered his manuscripts to a warder, who dared not take them, when Hua To burnt them. Legend, however, has it that a few leaves of his written work were recovered from the ashes, and that these described the method of castration, which is the only operation still known to the Chinese. The books extant bearing his name are two—viz., "Inner

Reflection Diagrams," and "The Internal Organs," and in the latter is a prescription which marks the earliest occurrence of the internal use of mercury in therapeutics.

The Four Methods of Diagnosis.

A prominent feature in this age of science was the introduction of the four methods of diagnosis—namely, observation, auscultation, interrogation, and palpation, but in course of time the first three methods fell into disuse, entire reliance being placed on palpation. The greatest importance was attached to this procedure, and it came to be believed that any internal diseases can be revealed by feeling the pulse alone. The supposed sympathy that exists between the different points and the pulse and the internal organs are set down in the following table :—

		Left wrist.	*Right wrist.*
Inch when lightly pressed	indicates the state of the	small intestines.	large intestines.
,, ,, heavily ,,		heart.	lungs.
Bar ,, lightly ,,		gall-bladder.	stomach.
,, ,, heavily ,,		liver.	spleen.
Cubit ,, lightly ,,		urinary bladder.	three passages.
,, ,, heavily ,,		kidneys.	gate of life.

The last two are imaginary organs.

Alchemy.

Buddhism was introduced into China by Ming Ti in A.D. 66 with unfortunate results for science. At first making but little progress it gradually gained a firm foothold, when the Taoists, realising their declining influence and wishing to stem the tide of opposition, became active. Chang Tao-Ling, popularly known to foreigners as the Taoist pope, invented charms and incantations for the curing of diseases and, seeing the lucrative income brought in by these devices, the Buddhist monks invented their system of charms, with the result that the people were steeped in superstition.

As in Europe 1200 years later, the search for the philosopher's stone and the elixir of life reached their height during the Tang Dynasty, an age of superstition. Magicians, doctors, and alchemists were found everywhere experimenting with herbs and minerals in an attempt to discover a substance which could confer on the person drinking it everlasting beauty or life. Of 22 rulers of this period seven experimented with these elixirs and died from the effects, and in these vain pursuits the time, the health, and the fortunes of thousands were wasted. Chief among the alchemists was Keh Hung, A.D. 281–360, who wrote the famous "Handbook of Emergencies." This book contains an authentic description of small-pox—the first in the world—Rhazes' account, which is regarded as the earliest record, being between A.D. 880–932. Another famous doctor was Tao Hung-ching, the author of "Formulæ of Famous Physicians," which is a work on medical plants. The previous materia medica contained only 365 kinds of herbs; Tao included in his treatise 365 additional drugs, exactly doubling the original number.

The Literature in the Tang Period.

The most important works on medicine in the Tang Dynasty were the "Thousand Gold Remedies" (A.D. 652) and the "Medical Secrets of an Official." The former is a book of 60 volumes by Sun Su-moh, a doctor of literature, who is immortalised as one of the genii. There is a supplement of 30 volumes, containing a full collection of incantations. The latter was compiled by Wang Chu, who was not a doctor by profession. Many formulæ for demoniacal possessions and other peculiar diseases are found scattered among its pages. It consists of 40 volumes. These two works sum up the teachings and discoveries up to that time. Treatment forms the chief feature of these books. In fact, they are collections of prescriptions and remedies corresponding to the modern system of treatment.

The fame of Chinese medicine during the Han and Tang Dynasties spread far and wide. It is recorded that in A.D. 609 Japan sent Dr. Fuyiwaiyi and others to study medicine in China, where they stayed for 15 years.

While Nelaton, in Paris, invented the catheter in 1850, in China the instrument was known in the seventh century A.D. In the "Thousand Gold Remedies" the hollow leaves of *Allium fistulosum* are recommended to be inserted into the urethra to a depth of three inches, when air is then blown into them. One doctor mentioned in another treatise, the "Precious Mirror of Hygiene," used an empty pig's bladder with a quill tied to it for a similar purpose, but for obvious reasons such crude technique, attended with risks, soon fell into disuse. The idea of vaccine therapy seems to have been promulgated, and an instance is recorded in which the patient's own pus was taken and injected under the skin around the original sore. Organotherapy, formerly much ridiculed and now hailed as a valuable modern discovery, was known to every Chinese housewife. The use of sheep thyroid for cretinism, goitre, &c., is mentioned in the sixth century. Even psychotherapeutics, so much in vogue nowadays, was practised as early as the second century B.C. in the form of charms and incantations.

III. The Mediæval or Controversial Period.

The Chinese have a great reverence for authority. What the ancient authorities assert is regarded as always right; the accuracy of their statements is unquestioned, and this veneration of the ancients amounts almost to a worship and is the chief cause of the scarcity of original writings and the petrified fixedness of Chinese medicine.

Literature.—In the beginnings of the Sung Dynasty a marked change is noticed. Monographs on particular diseases began to appear. The number and variety of publications in this dynasty exceed that of all the previous dynasties put together; many of them are quite original. A selected list of the most important works is given below.

1. Tung Keh: Treatment of Beri-beri. 2 vols. The first and only monograph on this subject.
2. Shen Chi: Care of the Aged. The earliest treatise on hygiene with special reference to the care of feeding of old people.
3. Chen Chi-Ming: Text-book of Women's Diseases. 24 vols. A special work on diseases peculiar to women. The first of its kind in this branch of medicine.
4. Obstetrics. 2 vols. Author unknown. This is the earliest monograph on this important subject.
5. Chen Yin: Three Causes of Diseases. 18 vols. A standard work on pathology.
6. The Fontenele. 2 vols. Anonymous. It is said that the success of Chien Yueh, the greatest doctor on children's diseases, was due to a thorough knowledge of this book, which is the earliest special treatise on diseases of infants.
7. The Copper Model. 7 vols. Also anonymous. The first practical handbook on acupuncture.
8. Li Shun: On Carbuncle. 1 vol. An interesting monograph.
9. Royal Infirmary Model Essays. 9 vols. Author unknown. It is a collection of examination papers.
10. Chang Kuo: Medical Miscellany. 10 vols. Contains much that is of interest. Useful for reference.
11. Imperial Cyclopædia of Medicine. 200 vols. Compiled under imperial orders by a staff of medical men. A remarkable work, but unfortunately most of the volumes have been lost.

The distinct features of this dynasty are the inoculation against small-pox which was discovered in 1022, the establishment of medical schools, and the holding of State medical examinations in 1068. Gradually the schools declined and then ceased to exist until 1280 when they were revived by Imperial decrees. State examinations were also discontinued for some time but reintroduced in 1317.

In the Ming Dynasty another change is noticed. The publications became controversial, attacking old writings as well as contemporary literature. Four distinct schools may be recognised. Liu Shou-Cheng propounded the theory that diseases were caused by excessive heat in the body and advocated the use of cooling medicines. Chang Tzu-Ho was famous for his "attacking" policy. He compared diseases to a foreign substance in the system which should be attacked and driven out by drastic drugs such as purgatives, emetics, and diaphoretics. Li Tung-yuan emphasised the importance of the spleen and stomach, and put down the causes of all diseases as due to derangements of the digestive tract. Chu Tan-chi thought that malnutrition was the root of all troubles; hence he extolled the value of tonics. These famous men are called the "Four Great Doctors of the Kin Yuan Period." Later writers, like Sih Lih-cha, Chen Hsiu-yuan, Chang Ching-yo, and others only revolved round the different schools.

Literature.—An important contribution to medical science in the Ming dynasty was the publication of the "Pen Tsao Kang Muh or Synopsis of Ancient Herbals." This is a standard work, compiled by Li Shi-chen, a district magistrate, who was born at Ki-chan, a town in the east of the province of Hupeh. It consists of 52 books and took the author 30 years to complete. All known works on materia medica, to the number of 41, were consulted, while references to 360 medical treatises and 591 other scientific and historical works were freely made. There were 71,096 formulas given in this work and the substances enumerated numbered 1892 kinds. These are arranged in 60 great classes under 16 orders. This treatise is one of the most popular and important books in Chinese medical literature and merits the praise accorded to it by doctors as well as laymen. The "Synopsis of Ancient Herbal" was published in 1590. Another valuable book is Wu Yiu-Ko's "On Plague," which is a special treatise on fevers and epidemic diseases. It contains many original observations and suggestions.

Syphilis.—In some quarters it is declared that syphilis originated from China, but this is not supported by fact. Most Chinese writers of this period maintained that it was unheard of in China till the middle of the sixteenth century and that it was introduced into Canton by Portuguese from India. These statements, though not strictly true, as there are other references recording its presence earlier than this

date, show that syphilis was prevalent in the Ming Dynasty. Indeed, the descriptions of this disease were very accurate and illuminating, and in one interesting monograph written in 1631 the various manifestations and the hereditary transmission of syphilis are mentioned in full detail.

(To be concluded.)

THE LITERATURE OF FOOD INVESTIGATION.

A NEW INDEX.

THE problem of food storage is far older than human civilisation, and was successfully tackled by plants and animals before man appeared on this earth. The density of modern industrial populations has created, however, difficulties in respect of the storage and transport of food which are being overcome only by the application of scientific studies covering wide fields in the domains of chemistry, physics, biology, and engineering. The value of such scientific studies becomes clear when we realise that they alone have made it possible for us in Great Britain to purchase at a reasonable price all the year round a variety of fruits and vegetables, abundance of meat, fish, and dairy produce, including dried and condensed milks, as well as eggs and butter. But the facilities created by such investigations not only enable the urban populations of the home country to enjoy a more varied, and, in certain seasons of the year, more wholesome diet, but they help to create a vast field of enterprise in food-producing countries abroad, and are therefore of fundamental importance to us as an empire which theoretically should be capable of producing and distributing all the food its enormous populations require.

The practical importance of investigations connected even remotely with the principles and methods of food transport and storage was discussed at the Imperial Agricultural Research Conference held in 1927 and it was then decided that a list of publications dealing with such matters should be issued at regular intervals, so that those engaged in any particular branch of the work might be enabled quickly to become acquainted with what has already been accomplished in that sphere. The first of these lists has just been issued under the title of "Index to the Literature of Food Investigation," and it is proposed to continue their publication bi-annually; they are compiled by the Low Temperature Research Station of the Department of Scientific and Industrial Research at Cambridge. The preface to the present number contains a brief account of the development of modern knowledge concerning cold storage, and illustrates the necessity of detailed investigations of a vast number of points in connexion with every variety of food product. For example, egg-yolk frozen without any particular regard to the temperature conditions may undergo an irreversible change which causes it to turn into an unpalatable pasty mass; this change does not take place at temperatures above $-6°$ C., which is therefore to be regarded as a critical temperature for egg-yolk. Critical temperatures have been found for other food substances and are of obvious commercial importance since they define the limits within which foods can be chilled. Again, it has become clear that fruits under storage conditions must be regarded as living tissues which are continuously respiring and therefore altering the percentages of oxygen and carbon dioxide in the enclosed space which they occupy; the latter factors, in conjunction with the temperature, in turn influence their rate of ripening and their liability to disease. These two examples may help to illustrate the complexity of the problems that have to be studied to ensure the delivery to the customer of food in first-class condition. This issue of the index contains references to some 700 papers, most of which have appeared during the last two years, and a brief outline of the scope of each paper is appended below the title. One of the largest sections into which the subject-matter is divided is concerned with dairy produce, and some idea of the comprehensiveness of the investigations reviewed may be obtained by noting the subjects included under this heading—namely, heat treatment and cold storage, dehydration and canning, the bacteriology of putrefaction, and methods of analysis, with subsections dealing with patent specifications. Cheese-making and butter-making are considered from various aspects which include modern methods of manufacture and studies of the conditions affecting the qualities of the final products.

It is clear that a periodical of this kind will prove of value, not only to those engaged in the production, transport, and storage of food, but also to those interested in the study of human and animal nutrition, whether from the practical or from the scientific standpoint. Copies of the index (the price of which is two shillings) may be obtained from the usual agents of H.M. Stationery Office; special arrangements have been made for its sale in the United States at the British Library of Information, French Buildings, 5, East 45th-street, New York.

OCCUPATIONAL CANCER IN COTTON WORKERS.

AN address on cancer in relation to occupation was given to a conference of Trade Union Approved Societies in Manchester, on July 16th, by Dr. S. A. Henry. He pointed out that certain classes of skin epithelioma may now be regarded definitely as occupational in origin. So far as it affected mule-spinners, the spray of mineral oil reaching the clothing of the worker was the cause in the majority of cases. The Factory Department of the Home Office had now record of 869 cases of epithelioma of the skin in cotton mule spinners; 714 (82·2 per cent.) in those who were employed as spinners when the disease was recognised, 33 (3·8 per cent.) in those who had retired from work from one to sixteen years previously, and 122 (14·0 per cent.) in ex-spinners who had passed into other occupations for periods varying from a few months to thirty years. Cotton mule spinning was sixth in the list of the occupations with the highest comparative mortality figure from all forms of cancer. The earliest age at which the disease had been recognised was 22, and the latest 77. Of the persons affected, only 1 per cent. were under 30 years of age, and 4·2 per cent were under 35 years of age. The disease did not usually occur until the person afflicted had been employed in the mule room for some considerable time. In 1911, deaths from scrotal epithelioma in mule spinners made up 9 per cent. of the number of deaths from this cause in England and Wales, in 1924 they made up 40·3 per cent. Dr. Henry also dealt with the use of various types of mineral oil, and cited Dr. Twort's recent experiments in Manchester, which showed that of all samples of oil he had examined, shale was the most likely to produce cancer. Further research into occupational cancer of the skin was urgently needed.

OBJECTIONABLE ANAEROBIOSIS.

MANY experiments on micro-organisms are conducted under anaerobic conditions, or, at least, conditions which are believed to be such. The essential sought is complete absence of oxygen, and, incidentally, of all active gases. As a counsel of perfection the use of argon might well be advised, but this does not seem to be done. In the current issue of the *Biochemical Journal* Mr. H. Nicol calls attention to a well-known but little heeded objection to the use of alkaline pyrogallol as a means of removing oxygen. The evolution of carbon monoxide when oxygen is absorbed by this reagent has long been known to occur, although the proportion formed can be kept down to amounts which are negligible for purposes of gas analysis by proper precautions. In bacteriological work it is not easy to observe these precautions, and in any case small traces of carbon monoxide may have a toxic effect on the organisms experimented with or possibly may serve as a source of oxygen. It is not of course difficult to free nitrogen from carbon monoxide, but this means the introduction of the gas into the apparatus containing the culture, and is more troublesome than the usual plan of absorption in situ. The use of oil on the surface of a liquid medium is not effective, for oils absorb oxygen from the air and allow it to pass downward to the liquid beneath.

A NEW POCKET ELECTRIC AURISCOPE.

AN auriscope which carries its own illumination and is suitable for the waistcoat pocket has been put on the market by Messrs. John Smith and Son, of Glasgow, at 32*s.* 6*d.*, who claim that it is British made throughout. The design is that of a small "fountain-pen" type of electric torch, with a dry battery in the handle; the usual bulb and reflector are removed, and a special adapter fitted, into which the auriscope plugs. This is provided with a detachable speculum, different sizes of which can be supplied and would be necessary in practice. The lens is removable, to permit of working through the speculum, and there is a second smaller lens on a swinging arm which can be brought into position without interfering with the use of a probe or paracentesis knife. The apparatus is well made and convenient for use at the bedside. It has a fault which is common to many of these instruments. The lenses focus an object at the tip of the speculum and give good definition at this level; but when the patient is being examined the membrana tympani lies about half an inch beyond the tip of the speculum and is decidedly out of focus. This defect should be remedied by an alteration of the focal length of both lenses.

INDEX TO "THE LANCET," VOL. I., 1929.

THE Index and Title-page to Vol. I., 1929, which was completed with the issue of June 29th, is now ready. A copy will be sent gratis to subscribers on receipt of a post-card addressed to the Manager of THE LANCET, 1, Bedford-street, Strand, W.C. 2. Subscribers who have not already indicated their desire to receive Indexes regularly as published should do so now.

Fifty Years OF DERMATOLOGY.

A MALCOLM MORRIS MEMORIAL LECTURE

Delivered on May 16th, 1929, under the Auspices of the Chadwick Trust,

BY SIR NORMAN WALKER, M.D., LL.D., F.R.C.P.,
CONSULTING PHYSICIAN FOR DISEASES OF THE SKIN TO THE ROYAL INFIRMARY, EDINBURGH.

THOSE who decided that the Malcolm Morris Memorial Lectures (of which this is the third) should be concerned alternately with dermatology and public health made a very wise and far-seeing decision. The subjects are closely interwoven, and to both of them Morris gave of his best.

I propose to sketch the progress of dermatology during the last 50 years, during most of which Malcolm Morris was an active force. When, after qualifying as a Member of the Royal College of Surgeons of England in 1870, and after a period of study in Vienna, Morris commenced practice in Goole, I question whether there were many inhabitants of the East Riding who had ever heard the word dermatology. Skin diseases were, at that period, commonly attributed to dirt (and my native country had an unenviable reputation in that respect), to some mysterious humours which no one could satisfactorily explain, or to gout, which, being a fashionable complaint of the better classes, was itself sufficient for the climbers of those days. It is so nearly 50 years since I commenced the study of medicine that I make no excuses for using that as another reason for the round figure. Nor, I think, do I need to make any when I begin these reflections with special reference to Edinburgh.

DERMATOLOGY IN EDINBURGH.

In 1880, dermatology in Edinburgh was in a state of hibernation. In the middle of the nineteenth century it had had quite an active period. Hughes Bennett, whose name is best known as a physiologist and as a physician, and to whom belongs the credit of having been the first to introduce the use of the microscope into the teaching of clinical medicine in Edinburgh, took an active interest in dermatology, and his writings on many dermatological subjects are still well worthy of perusal by even the youngest of our craft. He was not alone in his interest, for his colleague, Laycock, the Professor of Medicine, was also, to use the quaint wording of the Anatomy Act, "addicted" to dermatology. In those days, every professor in the Faculty of Medicine had the right to a share in the medical wards of the Royal Infirmary, for the purpose of giving clinical instruction to his students. But as there were not enough wards to go round there was an in-and-out arrangement, under which each took charge for periods of three months. Chance brought it about that the charge of the wards allocated to the diseases of the skin alternated between Laycock and Hughes Bennett, and I have heard from many old friends, now passed to their rest, of the enjoyment of the students who had the opportunity of going round with each when he took over charge from the other, and of hearing very candid accounts of the blunders in diagnosis and the inadequate treatment which had occurred during his absence. They had no direct followers and when I began medicine in 1880 there were no skin wards in our new Royal Infirmary. There was, however, one ward in which there were usually some skin cases. I alluded a few minutes ago to the fact that any professor in the faculty could claim opportunities for teaching clinical medicine, and that in the past these opportunities had been exercised by occupants of the chairs of botany, chemistry, anatomy, pathology, materia medica, physiology, and medical jurisprudence. In the days I speak of the last of these chairs was occupied by Sir Douglas Maclagen, a member of a famous Scottish family which supplied southerners with an Archbishop of York. Sir Douglas, before he was appointed professor, had served his time as an ordinary surgeon to the infirmary but, curiously, the privileges granted to the physicians were not extended to the surgeons. In his youth, Maclagen had spent a good deal of time in post-graduate study in Paris, then the Mecca of dermatology and, on his return to active duty as a physician in the infirmary, he filled many of his beds with skin cases, and when his turn came round to give a clinical lecture he usually selected his subject from some of them. Several of the ordinary physicians and surgeons took some interest in skin diseases and it was my good fortune to commence clinical work—as Chairman of the Examination Committee of the General Medical Council I should almost blush to confess it—in my very first year under one whose personality is known the whole world over, thanks to Sir Arthur Conan Doyle, as Sherlock Holmes. Dr. Joseph Bell was the last of a long line of Bells, surgeons in Edinburgh. To his out-patient clinics came patients with all sorts of diseases, not a few of them dermatological, and no one would have appreciated more intelligently the detective skill which Joe Bell showed in investigating these cases than Malcolm Morris. It was from Bell that I first learned to distinguish between lupus and rodent ulcer, a distinction not made and not regarded as seriously important by some of his colleagues. A happy inspiration led me to ask the clerk of the Royal College of Surgeons of Edinburgh to search the minutes of the College, and I learnt with great interest that Malcolm Morris was proposed for the Fellowship of the College in 1882 by Sir Joseph Fayrer and seconded by Dr. Joseph Bell. Morris often used jokingly to refer to the fact that a part of his success was to be attributed to the fact that, owing to his Christian name and to the fact that he was a Fellow of the Royal College of Surgeons of Edinburgh, some people assumed that he must be a Scotsman and therefore capable.

When Morris commenced practice in London the dominant personalities were Erasmus Wilson, Jonathan Hutchinson, and Tilbury Fox. In many hospitals the skin appointment—if there was one—was held by some member of the staff—usually the junior staff—in addition to his ordinary duties, and he had to make his own opportunities for investigation. I have a vivid recollection of a day spent with my old friend, Colcott Fox; we lunched at the National Liberal Club, went to Westminster Hospital at 2 o'clock, and from then until nearly 7 he saw a constant stream of patients and I know that, long before the end, my mental capacity was exhausted! Two or three students looked in at various periods during the afternoon and, no doubt, picked up some crumbs from Fox's sage comments. While much yet remains to be done, the contrast in the present day is very remarkable. It no longer remains a chance whether the person whom circumstances put in charge of the skin department was interested or whether he regarded it as a duty to be discharged in order to get back to his own job. Almost every teaching school in the country is now supplied with a well-trained dermatologist, and the students of to-day get regular, careful, systematic instruction.

My own immediate chief in Edinburgh was Allan Jamieson. He had a career interestingly like that of his friend Morris, for they met at Hebra's feet in Vienna and lit their torches at his altar. They each spent some useful years in general practice in a seaport town—as a residence, I should place Berwick-on-Tweed before Goole—and each, having spent some time in study abroad, settled as a general practitioner in the town where he was educated. In these larger fields they found more scope for their special interests. Their experience and their influence grew, and each played a notable part in forwarding the art of dermatology. Jamieson had at first one—later extended to two—out-patient days in the week and his Saturday clinics were often attended by as many as 300

students. Now the department has a staff of six and 22 beds, and the out-patient department is open daily; it needs to be! There are still lecture demonstrations to as many as 200 students, but the groups for clinical teaching are limited to 15.

If I were to endeavour to allocate the beatitudes among my friends, I would not put Morris among the "meek." But I would put him high among the "peacemakers." The path of dermatology in these 50 years has not been one of uniform smooth progress. There have been obstacles to circumvent and morasses to cross. In the overcoming of all these difficulties Morris's counsel was always wise, and the harmonious relations now existing in our ranks owe not a little to him.

I think my best plan to illustrate the progress of dermatology in the half century is to contrast the position of certain diseases as they were 50 years ago with their position now.

Rodent Ulcer.

I begin with rodent ulcer, with which subject Morris had a very interesting connexion. Of that disease we older dermatologists have memories which one hopes can never again be put on record. There used to arrive at our out-patient departments miserable wretches with half their faces eaten away and stories of how they had for years been carefully applying this, that, or the other ointment. Rodent ulcer has always been a fascinating subject for the young dermatologist and many have done their first original work on the investigation of its pathology. In a moment I shall refer to modern methods of treatment, but these would be of comparatively little avail were it not that increasing knowledge and more abundant opportunities of demonstrating the early stages of the disease to students had resulted in the earlier appearance of cases at hospital. I can remember, in my student days, watching with bated breath the late Prof. Annandale, a plastic surgeon of the very first rank, cutting away extensive ulcers and leaving gaps which seemed to us students impossible ever to fill. Others treated these extensive cases with caustics, but the number successfully treated by any method was small and the patients mostly died a miserable death. One of the most interesting events of the early days of X ray therapy was Sequeira's accidental discovery that rodent ulcer responded to X rays, and many of the later ulcerated cases were cured by this means. Then came the radium treatment, which was quite dramatically successful, as I can testify from personal experience. The interest aroused and the attention drawn to it has had the effect that sufferers are now almost invariably advised of the position and of the right methods of treatment at a stage when the prognosis is almost entirely favourable. If the new hopes of more abundant supplies and more adequate organisation of the use of radium in other forms of cancer are fulfilled, the pioneer success of radium in rodent ulcer should stand as a landmark.

Lupus.

In referring to tuberculosis of the skin, it would be a crime to omit reference to what Morris did for the campaign against tuberculosis in general. His organising powers, his ready pen, and his fearless courage were important factors in the promotion of the campaign against tuberculosis, for he had the happy knack of the journalist in interesting the public in whatever subject he took up. But here I am concerned with tuberculosis of the skin, or lupus—the wolf. I can vividly remember the old days when patients with lupus might attend almost any department of a hospital and were, I fear, generally regarded as very uninteresting cases. In Edinburgh they fell mainly under the care of the surgeons, who had one remedy, or perhaps I might say two: the sharp spoon and the cautery. I remember, as a young man, one of the surgeons to the Royal Infirmary showing to the Medico-Chirurgical Society a case which he had scraped 77 times! The patients were scraped, remained sufficiently long in hospital for healing to commence, and were then discharged, to return six months, 12 months, or 18 months later, worse than they were before, to undergo the same treatment again. I sometimes think that insufficient credit is given to the work of Unna, of Hamburg, who popularised the use of salicylic acid. I use the word "popularised" because I believe Unna was not the first to use it and that the credit for the original observation of its good effects on lupus is due to a Yorkshire house surgeon whom I have never been able to identify. This was the method in vogue and being carried out when I was appointed assistant to Allan Jamieson in 1892. The method still has its place in the treatment of exceptional cases, but its part in advancing matters at that stage was the demand it made for more frequent attendances and closer observation. Of course other caustic methods were in use and some teachers, notably one of my own masters—Prof. Pick, of Prague—used it with great freedom. I saw much of it for he was good enough to say that I worked the thermo-cautery better than any other of his assistants! I was not, however, so impressed with its good effects as to use it much when I had personal charge of patients.

With the introduction of tuberculin arose great hopes for the treatment of lupus, and it was my privilege to be attached to Pick's wards in Prague when that treatment was at its very beginning. Large doses were given at very brief intervals, severe reactions resulted, and I saw many of the cases a day or two later in the pathological department, where I was then working with Chiari. The results were such that only the very stern-hearted could persevere with the treatment, and it soon fell into desuetude. So far as I know there were only two leading dermatologists who did not discontinue it; these were McCall Anderson, of Glasgow, and Neisser, of Breslau. They were never addicts of the large dose, but preferred small doses and long intervals. For some years I treated a large number of patients by that method; many of them benefited, and I think much of the benefit was due to the tuberculin, but I am now convinced that quite as much was due to the fact that the fortnightly injection was introducing more method into the management of the cases, and that of course we did not restrict our treatment to tuberculin alone.

The next great step forward came when Finsen got to work. He began, it will be remembered, with studies on the effects of red light in the treatment of small-pox, and the extension of his experiments, and his application of light in various forms to other diseases, is an instance of how work commenced on purely scientific lines, often leads to important practical results. While the method of Finsen, both in its old and in its newer forms, still is probably the best of all methods of treatment for a few cases of lupus, our greatest debt to Finsen is not the method of treatment but the fact that he taught the need of perseverance. He organised the treatment of lupus and taught us that steady, persistent, daily treatment was essential in the cure of this obstinate disease. The enormous expense of his apparatus hindered its use in most centres in this country, and it had comparatively little trial in America—not because of the shortage of money, but because of the shortage of cases. Many an American visitor has told me that he has seen more cases of lupus in one day in my clinic than he had seen in the rest of his life.

Next came X ray therapy, and few of us can look back on their experience of it without bitter regrets. That the treatment was beneficial in a large number of cases is undeniable, but, as the years went by, the development of epithelioma became so frequent as to lead most cautious people to abandon it. Edinburgh is a sufficiently small centre to enable one to follow up one's cases pretty thoroughly, and I have to put on record that, of 66 cases of lupus treated by Dr. Allan Jamieson and myself in 1902, no fewer than 25 died of epithelioma. No doubt our methods were crude, the means of measuring the dosage were rudimentary and, as the improvement in the lupus was nearly always marked and as no one knew of the

dread after-results, we went complacently on. It may be that improved methods diminish this risk, but for a good many years I have not felt justified in recommending to patients a treatment to which I should certainly not submit to myself. In this matter I may be permitted a personal reference. In these early days I did a good deal of X ray work, and exposed my hands as freely as did all workers at that time. There developed on my hands one of these lesions from which the workers to-day never suffer—or should never suffer—and at a meeting of the old Dermatological Society of London one afternoon I exhibited the lesion to the members. No one was able to identify or explain it, but Morris said: "I don't know what it is, Walker, but if I were you I would have it out!" It was removed two days later by the late Prof. Alexis Thomson, and histological examination showed that it was well that it had been removed! One has a curious sense of pride in having been the first warning of many tragedies; I wish some of my friends had taken the warning!

I would have parted with X ray therapy in lupus with regret were it not that the new method of actino-therapy has proved so much more efficient. Not the least reason for this efficiency is the fact that organisation is essential. No one allows the patient to determine the date of his next visit. I have said elsewhere, I and repeat now that, of all the methods of treatment for lupus which I have tried, none approaches this latest method in efficiency. But organisation still comes first, and I believe that we would not have done so much good to some hundreds of patients had not a system been organised under which all the patients affected with the same disease were seen regularly once a week at the same hour. In July, 1914, at the meeting of the British Medical Association in Aberdeen, I read a paper entitled "On the Need for More Method in the Treatment of Lupus," and in it I mentioned that over 1000 cases had passed through my hands and that I wished I could think that 100 of them had been cured. I need not speak so pessimistically to-day. I have already elsewhere sounded a note of warning against the indiscriminate use of light. We know no more of the late effects of actino-therapy than we did of those of X rays in 1900, but we do know that excessive exposure to light, not only in tropical countries but even in our own, may be followed by epitheliomatous tumours which, unless promptly recognised and treated, may go on to malignancy, and I take this opportunity of repeating my warning.*

In lupus, too, we see the results of the improvement in medical education. We have not got so far as we have in rodent ulcer; students can still see cases which are no credit to somebody, but they do see many more cases at the early stage, and their teachers have the opportunity of pointing out its early appearances, of impressing on them what will be the result of neglect of adequate treatment, and of instructing them in the method of referring necessitous cases to the proper authorities. I take this opportunity of testifying to the helpful coöperation of most of our Scottish authorities in this matter.

Leprosy.

Fortunately in this country nowadays this most dreaded of all infectious diseases of the skin is but a small problem. The law takes no note of it, doctors are under no liability to notify it and, when a case of the disease contracted abroad does come under our notice, we are placed in a very delicate situation. Again I mention Morris who did a great deal, very tactfully, to ease that situation. It is to other countries we must look for records of progress within living memory. In Norway the results of organised supervision have been significantly successful, and it further supports my argument that the discoverer of the bacillus and the Director of Administration were one and the same man, Armauer Hansen. I had the pleasure last week of listening to the lecture here on "Medicine in India" by Mr. Johnstone-Saint. We are just beginning in that country to approach the problem from the modern standpoint. Segregation is older than the Christian era. It is publicity, early diagnosis, and the organised application of scientific methods that are beginning to make some impression on this enormous problem. The Americans, whose organising talents and activities are the envy of us all—though we may jibe at "mass production"—have given a very inspiring lead in the tropical regions where they hold sway.

Venereal Diseases.

The change of attitude towards venereal diseases owes much to Morris, and I recall with interest that it was on his persuasion that I put my name to the famous letter in the *Morning Post* calling on the public and the medical profession to look the facts of these diseases in the face, and that I was the only one to do so among those reputedly more cautious of the inhabitants of this island who live north of the Tweed. It is at least permissible to claim that that letter greatly forwarded the movement which culminated in the Venereal Diseases Act, and a consequent organised attack on an insidious and concealed enemy which was doing much to sap the health of the nation. Among the effects of the Act is the stimulus it has given to research in these diseases, to a better understanding of their far-reaching effects, to much more thorough and satisfactory treatment, and, not least, to the formation of a company of men and women whose zeal and enthusiasm in their work may justifiably be compared with that of those who devote their lives to the mission-field. I know that some of us older dermatologists whose work did not lie in that direction were a little uneasy about the addition, as a branch of dermatology, of a subject to which we had not previously been addicted but, as the representative of a school where there has been no merging, I can testify that nothing but good has resulted from coöperation with the zealot who is in charge of the new branch, and the benefit to our students has been incalculable. In place of an occasional Saturday clinic from an assistant surgeon who, sometimes at least, was obviously pining for the time when, having served his term, he would pass on to his real interest in surgery, our students now receive very thorough, systematic, and practical instruction, and we can guarantee that, when they leave us to make their own way in the world, they *do* know how to handle these diseases. There are, I know, some critics who profess to be disappointed with the present results and who say there is no appreciable diminution in the number of cases reported. This was, of course, to be expected, and has been the experience of similar campaigns against other infectious diseases. But even before the Act. enormous progress had been made. Since the introduction of the Wassermann and other reactions, and of salvarsan by Ehrlich, with all the similar products which have followed it, the greater accuracy of diagnosis and the more efficient treatment mark a striking advance in the management of that group of diseases. Even the straitest individualist must admit that the organisation necessary for the schemes concerned plays the leading part in their success.

Ringworm and Favus.

The epithet *opprobium dermatologicum* ("disgrace to dermatology") once applied to ringworm was well deserved, and the old custom under which mothers brought their children to an out-patient skin department, got a prescription, and might return in a week, a month, six months, or never, thoroughly merited the term. The changes in recent years in the outlook for sufferers from these fungus diseases are another testimony to the value of coöperation between the scientist, the clinician, and the organiser. When I was working with Pick in 1890 he was endeavouring, with but moderate success, to cultivate the fungus of ringworm. The hobby, as it then appeared, became more general, and workers used to exchange cultures

* Since I delivered this lecture there has reached me a copy of an address delivered by Dr. George McKee of New York which contains a similar warning.

just as orchid fanciers do! There did not seem to be much practical value to come out of it, and the pessimists and the cynics said many cutting things, but it directed attention to the subject and was one of the many to which Sir Malcolm devoted his energies. His book, "Ringworm in the Light of Recent Research: Pathology, Treatment, Prophylaxis," published in 1898, was an important contribution. But the most zealous organiser had a hard row to hoe! The disease was regarded as a nuisance but, as it did small harm to health, was but little considered. I heard from my mother that, when she was 10 years old, 87 years ago, she was discovered to have ringworm. She was removed from the better-class school which she was then attending, but attended, for over a year, without any difficulty being raised, what she described as the "Keelies'" school in Stockbridge! I think we owe the immense change which has come over the situation mainly to two things: the inspection of school-children, and an action of the Russian government which sent Jews and favus from Russia to London many years ago. We were painfully familiar with favus in Edinburgh, but it was the Russian immigrants who opened your eyes to its seriousness in London. The problem was almost at once realised, and the organised arrangements made at the London Hospital have restored favus in London to its old place of a curosity. One can look back from the now universal and universally approved inspection of school-children to the attitude with which it was received when it was introduced in the first decade of this century. Some of the older inspectors can still amuse us with stories of the crowds of angry mothers who waited outside the doors of the school to see the inspector. An immense amount of feeling was aroused; once, breaking a journey between London and Edinburgh to spend a night with an old assistant in the Midlands, I was invited to attend a public meeting, which was to be held that evening, with the vicar in the chair, to protest against this interference with the liberty of the subject. Some of you may be familiar with the local patriotism of our border towns; the spirit of competition between them affects everything, and when the inspector reported that the percentage of "dirty heads" in the schools in Burgh A was 54, local feeling was aroused, not at the figures, but at the fact that the same inspector reported that in Burgh B it was only 48!

After a good deal of persuasion the Edinburgh School Board established, in 1912, a special school for children affected with ringworm and favus. I remember very vividly the storm which its opening aroused. The columns of our evening papers were filled with letters of protest. It so happened that for convenience the school was established close to the Royal Infirmary and accidentally it happened to be near two of our largest public schools for boys. The correspondents drew attention to the risks that the pupils of these schools would run, and, with that tendency of newspaper correspondents to follow the mentality of the auction room, higher and higher objections were raised until one imaginative person warned the university that the risk to the students attending the infirmary would be so great that parents in the colonies would no longer send their sons to Edinburgh. When the schools was opened in January, 1912, about 60 pupils were admitted, most of whom had been absent from school for periods varying from a few months to four years; several had never been to school, amongst them two boys 12 years old. The increasing number of cases—I draw attention to this—necessitated enlargement of the school, and three years later the next-door house was acquired and accommodation provided for 160 pupils. In the session 1920–21 290 pupils were discharged cured; the greatest number in any one session. In 1924 the numbers began to decrease rapidly and in 1926 the staff was reduced to its original number of three teachers, eight having been at one time necessary. Over 2300 children have passed through the school and now the majority of those attending are under school age. The detailed figures are instructive: 1912, 67; 1913, 97; 1914, 88; 1915, 143; 1916, 260; 1917, 262; 1918, 347; 1919, 381; 1920, 430; 1921, 402; 1922, 351; 1923, 344; 1924, 265; 1925, 214; 1926, 143; 1927, 117; 1928, 109. To-day there are only 20 pupils in the school. I have given details of this, firstly because it was under my own direct supervision, and secondly because it points the useful lesson that organised attention directed to such a disease invariably, at first, seems to increase the number of cases. What it does is to bring them to light; then a level is reached, and then the number begins to decline. It is of interest to know that the educational level attained was higher than the average in the schools under the authority, probably owing to the fact that the children got their dinner in the school and that the classes were smaller.

More striking still is the school's record of favus, a disease which used to provide from 20 to 40 new cases annually in the infirmary skin department; many of these, of course, were adults and "incurable." A year or two ago I asked our Central Education Authority to give me what information they could about the existence of the disease in Scotland and, after careful inquiry through their official channels, they reported to me that in the whole of Scotland there were 15 cases and none of them in Edinburgh. This success could not have been attained had it not been for the discovery that in X rays we had a remedy which, properly used, could be trusted to remove all the hairs from the affected scalp—diseased as well as healthy. I do not remember who was actually the first to use the rays in ringworm, but it is undoubtedly to Sabouraud that the general adoption of the method was due. Here, again, we owe an advance to the combination of laboratory and clinical methods. It was through scientific study of the fungus that the way lay to the cure of the disease. When one reflects that in the past, even in well-organised institutions, the average time required to cure the disease was over three years, and that it is now reduced to less than three months, the dermatologists need no longer smart under the gibes of their critics but may point to the thousands of years of education that have been saved in a little over 20 years.

It looks as if the X ray treatment of ringworm might, in its turn, have to give way to the thallium method. The history of thallium as a remedy is interesting. It has long been known that its administration was followed by alopecia, but it did not occur to anyone that it might possess such selective powers as to confine its action to definite areas, and it is indeed a very remarkable fact that it does so. Attempts were made to utilise its depilatory action in the treatment of ringworm quite early in this century, but were discontinued on account of the severe toxic symptoms produced. It was only in 1918 that Cicero published the results of his successful use of it in a series of cases. Since that date it has been quite extensively employed, and there are now records of over 3000 cases in which it has been proved efficacious. In the ringworm school in Edinburgh it has proved very satisfactory in shortening and simplifying treatment. The method has met with an unfortunate set-back on account of a recent calamity. The moral I draw from that is that it is unfortunate that the metric system used in the British Pharmacopœia of 1914 and long in use in all the scientific branches of medicine is so slow in spreading into practice.

While we have been prevailing in our struggle with ringworm of the scalp, another form of ringworm has made great strides in this country. I allude to the fungus infection of the skin long known in the East as dhobi itch—epidermophytosis. Many people think that the prevalence of this is a sequel of the war and indeed, many brought home the infection with them from the East. But it had made considerable progress before the war, particularly wherever collections of young men were gathered together. The very slight symptoms which it produces are largely responsible for its spread. A little irritation of the skin of the

hands or between the toes does not always send the patient to a doctor for advice; it is only when the symptoms are more severe that advice is sought. Nevertheless, the condition is all the while infectious, and I am sure that cases are becoming increasingly numerous. In a certain proportion of cases the nails become infected and I know of no fungus infection which one approaches with more respect than fungus infection of the nails. We have gone a long way to conquering ringworm of the scalp by organisation. I plead for its application to this condition! If an hour were set apart for a clinic for this malady alone I should look for the same measure of success as has been achieved in lupus, in ringworm of the scalp, in favus, and in diabetes. I think the most promising feature of the campaign against asthma is that cases are to be collected in clinics and studied in groups.

Scabies, Impetigo, and Pediculosis.

The teacher of dermatology may, from time to time, regret the diminution of his opportunities for teaching students to become familiar with what used to be very common diseases. This is particularly true of the commonest diseases, and there is no doubt that the teacher of to-day does not have the same superabundant opportunities of demonstrating cases of scabies, impetigo, and pediculosis as his predecessors had. In my own days it was almost always possible to demonstrate to students the close relationship between impetigo and pediculosis capitis. Thanks to school inspection, all these diseases have markedly diminished. They are still numerous, but I venture to prophesy the advent of a time when the teacher of dermatology will welcome the appearance of a really good example of impetigo to demonstrate to his students.

Urticaria, Erythema, Dermatitis, and Eczema.

With one exception, all the diseases I have dealt with fall obviously into the preventable category, for in all of them the cause is recognisable and determinable. But there remains a great mass of disease where the progress recorded, marked though it be, is not so dramatically presentable as in those already dealt with. To only two groups of these diseases have I time to refer. The first comprises the conditions known as urticaria (nettlerash), and erythema (redness), while the second includes the vast number of affections of the skin which, according to our fancy, we label "dermatitis" (inflammation of the skin), or "eczema," which is the Greek word for an eruption. It must be conceded that the labelling of a patient's ailment with one or other name does not greatly help, and it has become more and more evident that it is the cause that is important, and not the name. The one group, speaking generally, has characteristics which suggest that it arises from some internal cause, and the other, also speaking generally, rather suggests external irritation. It is along the lines of concentration on the possible cause, rather than on the appearance of the eruption, that marked progress has been made in these 50 years. It had long been known that the ingestion of certain foods—I merely instance oysters, lobsters, strawberries, and cherries—was followed in certain individuals by an outbreak of nettlerash. Some of the older authorities, in their condemnation of all fish and of all fruits, rather obscured the truth, but nevertheless there is evidence in some of their writings, and perhaps most of all in the works which, like Morris's, went through several editions, of something instinctively suspected but beyond their ken, a spirit like that of the old Athenians, who erected an altar to the Unknown God. "One man's meat is another man's poison" is an old proverb, and it is in the application of this that advance has been made. Even the oyster, perhaps the most notorious sinner, only affects a small percentage of humanity, and as one goes down the list the percentage decreases. But the list of substances to which some people react is being daily lengthened, and now that outbreaks of urticaria have been traced even to milk, it is obvious that the matter is one of importance. It is quite often possible, by starving a patient for a few days and then adding one article of diet after another, to alight on the cause, but this is often a very slow process. The hunt for the peccant article has been made much simpler by the introduction of the cutaneous tests. By their means, the sensitiveness of a particular individual to a particular substance can be at least suggested, and much time thereby saved. Some people, in my judgment, have adopted these tests too enthusiastically and expect that it will be possible to relate every case of urticaria to its cause if one only perseveres long enough. The relationship between urticaria and asthma, long remarked but little understood and not infrequently scoffed at, has been clarified by the demonstration that certain substances may produce one or other type of reaction. I do not wish to be thought to belittle the enthusiastic cutaneous tester; it is worth many hours of work if one can free a patient from a very troublesome symptom by simply advising him to avoid, in future, Findon haddock, some particular variety of cheese, tomatoes, chestnuts, or damson jam. There are other causes of urticaria than foods, and these must be sought with the same diligence.

I next come to that conglomerate assemblage of reactions of the skin which goes by the name of eczema. For two or three centuries authors have sought for a satisfactory definition. The fact is that it is impossible to define a condition which may be due to any one of hundreds of causes. It is rather remarkable that so many who sat at Hebra's feet did not carry further his researches into external causes! Their search was too often directed to some other organ of the body; eczema, it was held, had its manifestations on the skin, but the attitude was to seek for its cause anywhere rather than in the skin itself. It is to some extent unfortunate that Hebra devoted so much attention to the reaction produced on the skin by one or two irritants (notably croton oil) and assumed that all irritants would produce the same reaction. It is to the recognition of the fact that different irritants may produce apparently similar reactions in some persons, and that the same irritant may produce different reactions in others—in short, to a wider appreciation of the importance of idiosyncrasy—that we owe most of our recent advances. The skin and the stomach are wonderfully alike in this respect: there are a few persons who boast that they can eat anything, but most of us are aware that there are some things which agree with us better than others. So it is with the skin. There are very few who have a skin that nothing will irritate, and very few chemicals, using the word in a wide sense, which will not irritate some skin if brought into contact with it. Fifty years ago bakers' itch, bricklayers' itch, and washerwomans' itch were familiar. The work of my friend, Dr. Prosser White, on the industrial diseases of the skin shows an imposing list of over a hundred varieties, and we discover new ones every year. I agree with Hartzell when he says: "Many, if not most, of the cases of so-called acute eczema are, in fact, due to some plant, dye or drug with which the patient comes in contact." The search for the cause in a suspected case is an enthralling pursuit. I learned recently from Sir Harold that his father and I shared a common zest for those cases that required something of the detective instinct of Sherlock Holmes. Perhaps the most intriguing cases one has to deal with are those connected with the vegetable kingdom. The most familiar vegetable poison in this country is the Chinese primrose. It may be familiar, but it is astonishing how many cases one sees in enthusiastic floriculturists who are entirely ignorant of its irritant effects. No treatment, however skilfully directed, is of much use when the patient is innocently and ignorantly exposing himself to a noxious irritant.

Equipment.

The dermatologist of to-day has a vast armoury compared with that of his predecessor 50 years ago. He has scores of new weapons; some of them are very potent, and many are double-edged. Chemical

and bacteriological warfare is waged against the germs which infest the skin. New remedies are showered upon us with bewildering frequency, and, if many of them have but a short career, the good ones remain. The use (and no less the abuse) of vaccines is of great importance, but they require judgment and experience in their administration and their value is best tested and estimated by those whose knowledge and practice is not limited to these new remedies. I would counsel the younger generation not altogether to neglect old remedies and the principles which lie behind their use; to clean the skin, to keep it at rest, and to let nature do the cure, is as important as ever it was. I would not give up the use of the starch poultice (which Allan Jamieson learned to use in Paris and spent all his active life in advocating) for any dozen vaccines.

It is recorded of Hughes Bennett, whose name I mentioned earlier, that he treated all his acute cases with weak alkaline soaks and all his chronic ones, as Noah did the ark, with pitch within and without. It takes years of experience to understand exactly when and how to use tar, but it and its derivatives remain among the most useful of applications.

The older dermatologists perhaps took human nature more into consideration than do some of their successors. Possibly I am speaking from the maturer mind, and human nature has changed as well as remedies. I have often followed, with benefit to the patient, the spirit of a bit of advice Malcolm Morris once gave me; we were discussing the advantages and the rather manifest disadvantages of chrysarobin in the treatment of alopecia areata and the importance of interesting the patient in the treatment to be used. Morris said: "Instead of the conventional ointment or lotion I sometimes find it helpful in this condition to advise patients to cut a lemon in two, to sprinkle the cut surface with Goa powder and rub the part. If I am anxious to make the patient specially attentive to the treatment I advise him that limes are even better than lemons."

If I were to endeavour to find an explanation for the advance I would put it on four grounds:—

1. The improvement in school education; we get better-trained students than our predecessor did. I do not refer to the geniuses of the past or present, but to the average level.

2. The marked improvement in medical education and, not least, the introduction to what our American friends call the fundamental subjects. The students of to-day are far better grounded in chemistry, physics, biology, physiology, pathology, bacteriology, and pharmacology than we were, and are a more receptive soil for sowing the seed of the advances in medicine and surgery and their branches.

3. Next I would put research; everyone recognises the importance of research in every branch; in every laboratory and in every large hospital it is constantly going on, either as some special research or as an integral part of properly done routine work. Not the least important factor in the advance is the increasing combination between the clinician and the laboratory worker. I have no sympathy with and little belief in the assertion that these are two rival camps. Here and there it may be true that a narrow-minded individualist in a laboratory regards all other than laboratory workers as mere children at play, and here and there clinicians are still prepared to back their "clinical instinct" against any laboratory finding. But these are exceptions, and in all active centres throughout the world there is closer and closer combination between the two branches and, as the results continue to show the advantages of coöperation, it may be prophesied that the exceptions will get fewer and fewer.

4. Then there is coöperation. Special departments no longer work in little water-tight compartments. They touch, on the one side, their medical colleagues on the staff, and on the other those public authorities who are responsible for the health of the community. I have not, I think, stinted my expression of appreciation of what the community owes to the inspection of school-children. School-children are not the only class who would benefit from closer coöperation and organisation. Not long ago I had the pleasure and satisfaction of participating in an organised inquiry into a disease of the skin which had been known for over half a century to attack certain workers in the shale oil industry. The combination of the Home Office, an exceedingly capable local doctor, and an expert, was able to suggest a method which, in a few months, practically abolished a condition which meant suffering to many and death to some. In the reorganisation of local government, now in train, there is much hope that such methods will spread.

The dermatologist of the future has a wide field before him. He must come to it well equipped. Some used to argue that he should approach it through ten years of general practice, as Malcolm Morris and Allan Jamieson did. Here is a description of his qualifications from America: "He must of necessity be an internist (physician) and pathologist—if such a thing is possible, a better-trained internist than the internist himself. He must be a bacteriologist, a physiologist, an embryologist, and a physicist." That is the American ideal. Translated into our more practical form, it means that he must be thoroughly trained in all these subjects, and be capable of appreciating the work done by the experts in each and of applying such of it as is applicable to his own special work.

I close, in the spirit of what I have tried to make the theme of this lecture, with a quotation which I believe would have been appreciated by the man whose memory we recall to-day. As befits the son of a Scottish manse, I take it from the Bible and I think you will agree not inappropriately, from the Book of Job. There, in verses 15 and 16 of the twenty-ninth chapter, you will find these words: "I was eyes to the blind, and feet I was to the lame. I was a father to the poor, *and the cause I knew not I searched out.*"

A CONTRIBUTION TO THE STUDY OF RENAL GLYCOSURIA.

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When a reducing substance is found in the urine two questions naturally arise: (1) Is the reducing substance glucose? (2) Is the patient affected with true diabetes mellitus? To the first question a satisfactory answer can usually be given by carrying out the phenylhydrazine and fermentation tests for glucose. To the second question an affirmative answer may be given when the history and symptomatology are sufficiently characteristic; a negative answer, on the other hand, can only be given after careful investigation.

Glycosuria is said to be relatively uncommon and although its incidence may possibly vary in different classes of society, there can be little doubt that the excretion of glucose in the urine is more common than is generally supposed. This may be partly due to the not uncommon practice of requesting or accepting for routine examination a morning specimen of urine—that is, one passed after several hours' fast. It is obvious, therefore, that the accidental discovery of glucose in the urine of a patient who has no definite diabetic symptoms demands a careful investigation of the cause of the abnormality, since it is well known that a certain proportion of glycosuric patients are not true diabetics.

Of the conditions included in the group of non-diabetic glycosurias an important one is renal glycosuria, now recognised as a distinct clinical entity. A considerable amount of literature has already appeared on the subject, and various other names have been applied to this interesting anomaly, names such as "diabetes innocens," "glycosuria

without hyperglycæmia," and "negligible glycosuria," all of which may be regarded as synonymous.

Joslin[1] defines renal glycosuria as "a persistent glycosuria which is relatively independent of the diet, and in which there is absence of hyperglycæmia as well as of the symptoms of diabetes." Graham,[2] in 1916, described two types: the common one, in which less than 10 g. of sugar were excreted daily, and another type in which 10 to 30 g. were excreted. In 1923 he described another type[3] in which no sugar is detected in the urine when the patient abstains from food for a short time, but sugar is excreted when carbohydrates are eaten. This type he regarded as a link between normal people and patients with a typical renal glycosuria. Many other cases, of varying type and severity, have been published. Leyton[4] records 18 cases of which 7 had histories of glycosuria averaging 18 years. Garrod,[5] MacLean,[6] and Graham,[2 3] record numerous cases, and several papers have appeared, chiefly in American journals, describing cases in which glycosuria only appeared after a meal (Goto,[7] Strouse,[8] Murlin and Niles,[9] Lothrow,[10] John,[11] Goto and Kuno[12]).

Normally the kidney does not excrete glucose so long as the concentration of blood-sugar remains below 0·18 per cent. and this figure is generally accepted as the normal renal threshold for glucose. In renal glycosuria the threshold for glucose is lowered; it may be slightly, moderately, or greatly below the normal, and the kidney continues to excrete glucose so long as the blood-sugar concentration remains above the threshold level. Persistent glycosuria is not, therefore, a sine qua non in the diagnosis of renal glycosuria; and furthermore, in a certain number of cases the glycosuria is not relatively independent of the diet, but is, in reality, dependent upon it. Joslin's definition, therefore, is only applicable to certain cases. An important question thus arises, whether the different types of renal glycosuria are merely varying degrees of

FIG. 1.

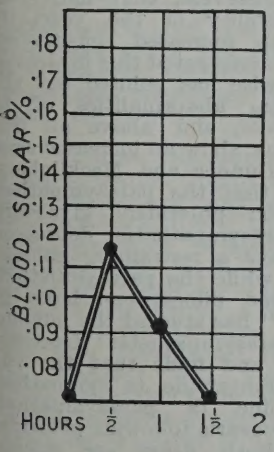
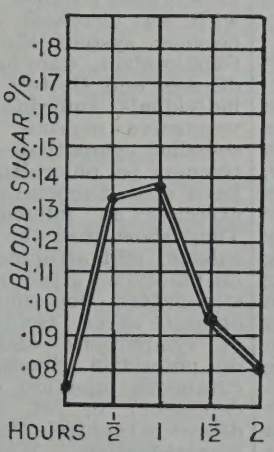


FIG. 2.



one type of abnormality, the variation depending upon the degree to which the kidney leak-point is removed from the normal, or whether they represent abnormal states differing in nature and ætiology.

It is generally stated that renal glycosuria is more or less harmless and requires no treatment. The study of the condition, however, brings to light certain problems which demand further elucidation. These problems have occurred to me in the course of a personal investigation and will be discussed after a brief description of six cases.

Clinical Histories.

CASE 1.—Male, aged 39, complained of feeling "overstrung" and nervous, due in his opinion to overwork. A general physical examination proved negative, with the exception of a slightly increased blood pressure, the figures being: systolic 150, diastolic 85. The Wassermann reaction was negative. The urine, however, contained a fair amount of glucose. Further investigation showed the morning urine (fasting) to be sugar-free, while the urine passed an hour and a half after a mixed meal contained a fair amount of glucose. A glucose tolerance test (50 g. of glucose) showed the blood-sugar curve to be not only well within normal limits, but abnormally low (Fig. 1). At the beginning of the test (fasting) the urine was sugar-free, while at the end of the test there was a moderate glycosuria.

CASE 2.—Male, aged 25, complained of general weakness, irritable temper, and headaches of four months' duration. A general physical examination proved negative. The urine, however, was found to contain glucose. A glucose tolerance test (50 g. of glucose) showed the blood-sugar curve to be well within normal limits (Fig. 2). At the beginning of the test (fasting) the urine contained a trace of glucose, while at the end of the test it contained 2 per cent.

CASE 3.—Female, aged 39, complained of attacks of tinnitus and giddiness accompanied at times by nausea

FIG. 3.

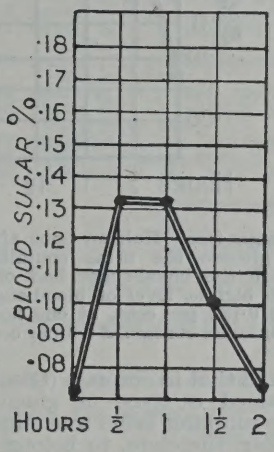
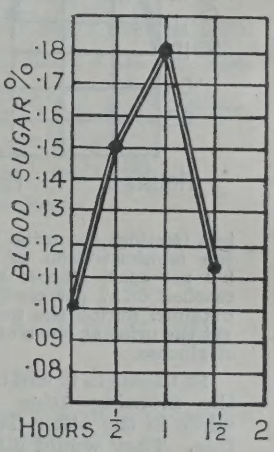


FIG. 4.



and vomiting. She had been examined by an aurist, who formed the opinion that the symptoms were not due to any aural disease. The symptoms first appeared after a long period of harassing work and mental strain. The patient was debilitated and neurasthenic and her urine was found to contain a small quantity of glucose. Further investigation showed the morning urine (fasting) to be sugar-free, while the urine passed an hour and a half after a mixed meal contained a moderate amount of glucose. A glucose tolerance test (50 g. of glucose) showed the blood-sugar curve to be well within normal limits (Fig. 3), but at the end of the test the urine contained a small quantity of glucose. In this patient the troublesome symptoms disappeared after a prolonged holiday and it was then noted that a carbohydrate meal failed to produce glycosuria.

CASE 4.—Male, aged 48, complained of headache, insomnia, weakness, and loss of weight. He was much engrossed in business and believed his symptoms to be due to worry. Examination showed a moderate degree of arterio-sclerosis. The systolic blood pressure was 148; the diastolic 90. The Wassermann reaction was negative. The urine was found to contain a moderate amount of glucose. Further investigation showed the morning urine (fasting) to be sugar-free, while the urine passed two hours after a carbohydrate meal contained 1·3 per cent. of glucose. A glucose tolerance test (50 g. of glucose) showed a normal curve (Fig. 4). At the beginning of the test (fasting) the urine was sugar-free. Half an hour after the administration of the glucose the blood-sugar had risen to 0·15 per cent. and the urine contained 0·63 per cent. of glucose. At one hour, when the blood-sugar had risen to 0·181 per cent., the urine contained 1·18 per cent. of glucose. At two hours the blood-sugar had dropped to the starting level of 0·1 per cent. and the urine then contained only a trace of glucose.

CASE 5.—Male, aged 54, was rejected at a life insurance examination on account of glycosuria, the urine being found to contain 0·9 per cent. of glucose. He was a well-developed, healthy looking man and felt in excellent health. A morning specimen of urine (fasting) was found to be sugar-free, while the urine passed two hours after a mixed meal contained a definite but small quantity of glucose. A glucose tolerance test (50 g. of glucose) showed a normal

curve (Fig. 5), but one hour after the administration of the glucose, when the blood-sugar had reached a level of 0·168 per cent., the urine contained 1·25 per cent. glucose.

CASE 6.—Male, aged 40, was rejected at a life examination on account of glycosuria. He appeared to be in perfect health. A glucose tolerance test (50 g. of glucose) showed a curve suggestive of early diabetes, but with a definitely lowered renal threshold (Fig. 6). At the beginning of the

FIG. 5.

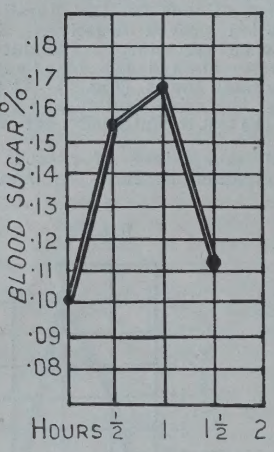
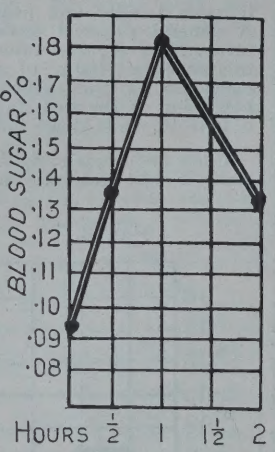


FIG. 6.



test (fasting) the urine was sugar-free. Half an hour after the administration of the glucose the urine contained 0·9 per cent. glucose although the blood-sugar had only reached 0·137 per cent. The highest level of blood-sugar obtained during the test was 0·182 per cent. at one hour, yet the urine at one and a half hours contained 6·6 per cent. of glucose.

In these six it will be noted that in one case (Case 2) the morning urine contained a trace of glucose, while in the other five the morning urine was sugar-free. They would all appear, therefore, to belong to that type of renal glycosuria in which the glycosuria only appears when carbohydrates are eaten.

Cause of the Lowering of the Renal Threshold in Certain Individuals.

MacLean[13] in 1923 stated that the exact condition of the kidney which caused renal glycosuria was obscure, and recently he has expressed the opinion that the problem is still unsolved. There are, however, certain interesting observations of other investigators which are worthy of note. Hamburger and Brinkman,[14] experimenting on dogs, found that the kidney threshold for glucose could be altered by varying the amounts of calcium and potassium in the perfusing fluid, an observation which raises the question whether the lowering of therenal threshold is dependent upon abnormalities in the composition or physical characters of the blood. This interesting hypothesis has been studied by Cammidge and Howard,[15] whose observations tend to confirm this view, and they accordingly define renal glycosuria as "a condition in which there is excretion of sugar in the urine that is relatively independent of the diet and occurs in an apparently healthy person whose blood is found to contain a subnormal or normal percentage of sugar no matter when it is examined, and shows an absolute and not merely a relative reduction in the proportion of calcium." In their experiments they found that the condition could be controlled, for some time at least, by the daily administration of calcium and parathyroid. In Case 1 of my series no special treatment was adopted when the abnormality was discovered. Seven months later the urine, passed two hours after a mixed meal, was found to contain 2 per cent. of glucose. The patient was then advised to take each day grs. 22½ of calcium sodium lactate and gr. 1/10 of parathyroid. Three weeks later there was no reduction in the glycosuria and after five weeks the urine still contained 1·1 per cent. of glucose two hours after a test-meal. In Case 4 the administration of calcium lactate and parathyroid appeared to bring about a reduction in the amount of glucose excreted. The effect, however, was only temporary, as the glycosuria increased when the drugs were discontinued.

Possible Relationship to Disturbances of the Vegetative Nervous System.

The possible relationship between renal glycosuria and disturbances of the vegetative nervous system has been studied experimentally by several Continental workers, who have approached the subject by investigating the nature of phloridzin glycosuria. It is well known that the administration of phloridzin (a glucoside), orally or by injection, results in the excretion of glucose by the kidneys. The glycosuria thus produced is at least considerable and may be enormous. The interesting point is that it is associated with a hypoglycæmia, so that the glucose is excreted with a lowered renal threshold. In that respect it is analogous to ordinary renal glycosuria. But the full explanation of the action of phloridzin is as yet unknown, since the glycosuria produced by it continues on a carbohydrate-free diet and when the liver is empty of glycogen. One view is that the kidney simply splits off and excretes sugar from the glucoside phloridzin, which re-combines with the blood-sugar, thus forming a cycle. On the other hand, it is held by some authorities that phloridzin acts by antagonizing the influence of insulin.

Zuntz[16] demonstrated many years ago that the injection of phloridzin into the renal artery of a dog resulted in the immediate elimination of sugar from the injected kidney, while the other kidney did not excrete sugar until a definite interval had elapsed, and then only in much smaller quantity. From this he concluded that phloridzin glycosuria was of purely renal origin. Later investigators, however, have raised the question of whether phloridzin acts directly on the renal cells or through the medium of the nervous system. It now appears to be definitely established, from the experiments of a great number of observers, that individuals with an increased irritability of the vegetative nervous system show an increased sensitiveness to phloridzin. Caro has demonstrated this in Graves's disease, and Grote[17] likewise has pointed out that individuals suffering from abnormalities of the vegetative nervous system, and above all from so-called sympatheticotonia, show an increased sensitiveness to phloridzin. Dünner and Mecklinberg[18] have also demonstrated that the parasympathetic exercises an influence on phloridzin glycosuria. They show that the parasympathetic depressors, calcium and atropine, have a restraining influence on phloridzin glycosuria, while the parasympathetic stimulators, potassium and pilocarpine, have the opposite effect. Goldberg[19] has studied the influence of sympathetic and parasympathetic depressors on phloridzin glycosuria and finds that the subcutaneous injection of ergotamine (a sympathetic depressor) or of atropine (a parasympathetic depressor) controls the glycosuria following phloridzin administration. When both drugs are injected together the controlling influence is more marked. Goldberg concludes, as a result of these experiments, that phloridzin glycosuria depends upon vagal and sympathetic stimulation, and that, since phloridzin glycosuria is a representative of the renal glycosurias, the dependence of ordinary renal glycosuria on similar disturbances of the vegetative nervous system is established.

The hypothesis thus formulated is interesting and attractive and may be the probable explanation of a certain number of cases. Four of my patients sought advice on account of nervous symptoms which might reasonably be attributed to disturbances of the vegetative nervous system. If increased irritability of the vegetative nervous system can influence the level of the renal threshold for glucose we may find herein an explanation of the view that

renal glycosurics have a deficiency of blood calcium. Chiari and Fröhlich[20] have shown that the excitability of the vegetative nervous system is markedly augmented by diminishing the calcium content of the body. It is probable, therefore, that the therapeutic administration of calcium to a renal glycosuric may produce a beneficial effect, not merely by altering the chemical and physical characters of the blood, but by diminishing the excitability of the vegetative nervous system.

In the present state of our knowledge it is not possible to state definitely what is the actual cause of the lowering of the renal threshold. There may be more than one cause, but it will be readily admitted that the hypothesis of disturbances of the vegetative nervous system marks a distinct advance in the study of a difficult problem.

Symptoms due to or Associated with Renal Glycosuria.

Cammidge and Howard have found that the subjects of renal glycosuria are easily tired and are incapable of prolonged exertion, probably owing to the low proportion of circulating sugar. Other writers describe various symptoms such as nervousness and debility. Four of my patients sought advice on account of definite symptoms of ill-health, symptoms mainly of the nature of functional disturbances of the nervous system. On the other hand, it is well known that renal glycosuria is frequently discovered in individuals who are apparently in excellent health.

Generally speaking the condition is regarded as permanent and cases have been recorded in which the glycosuria has persisted for many years with no apparent effect on the general health. In Case 3 of my series the patient was debilitated and suffered from various nervous symptoms. After a prolonged holiday the general health improved greatly, the nervous symptoms disappeared, and it was then found that a meal containing a good proportion of carbohydrate failed to produce glycosuria. In Case 6 also, in which the kidney leak-point for glucose was found to be below 0·138 per cent. in November, 1924, the blood-sugar curve suggested that the patient might be a potential diabetic. Recently, however, his family doctor reported to me that the patient was in good health and that a meal containing bread and sugar had failed to produce glycosuria. It is possible, therefore, as has been suggested by others, that there may be cases of renal glycosuria which are of a temporary nature.

Renal Glycosuria and True Diabetes.

Some writers sound a warning note regarding these cases, and suggest that they may develop true diabetes mellitus. It is not clear on what grounds this assumption is made. Renal glycosurics are probably just as likely to develop true diabetes as normal people are, but there is no evidence that they are more liable. A few cases of diabetes mellitus have been recorded in which the renal threshold was low. Shapland[21] reports one case in which the diabetes was complicated by gall-stones. Cholecystectomy produced a remarkable improvement in the diabetic condition, but had no apparent effect on the level of the renal threshold. Voigt[22] reports one case in which a fractional gastric analysis revealed a total absence of free hydrochloric acid. In his patient, the administration of dilute hydrochloric acid with meals, begun after three weeks of active anti-diabetic treatment, had no effect on the glycosuria. Lawrence,[23] in a recent paper in which he describes eight cases of diabetes mellitus with renal leak-points lying between 0·08 and 0·15 per cent., expresses the view that "there seems no reason to think that the combination of diabetes mellitus with a lowered renal threshold is not a mere coincidence." So far, then, as our present knowledge goes, there is no known relationship between renal glycosuria and diabetes mellitus. Renal glycosuria has been known to persist for many years without any apparent deterioration in health. Whether the condition is liable to variations or fluctuations, or can be in any way influenced by disturbances in the general health, are questions which can only be answered by the repeated examination of a large number of cases over a prolonged period.

References.

1. Joslin, E. P.: The Treatment of Diabetes Mellitus, London, 1924, p. 664.
2. Graham, G.: Quart. Jour. Med., 1916–17, x., 245.
3. Ibid., 1923, xvi., 236.
4. Leyton, O.: Practitioner, 1922, cviii., 113.
5. Garrod, A. E.: Quart. Jour. Med., 1915–16, vii., 493; and THE LANCET, 1912, i., 629.
6. MacLean, H.: Modern Methods in the Diagnosis and Treatment of Glycosuria and Diabetes, London, 1922, p. 46.
7. Goto, K.: Arch. Int. Med., 1918, xxii., 96.
8. Strouse, S.: Ibid., 1920, xxvi., 768.
9. Murlin, J. R., and Niles, W. L.: Amer. Jour. Med. Sci., 1917, cliii., 79.
10. Lothrop, A. P.: Jour. Biol. Chem., 1921, xlvi., 43.
11. John, H. J.: Jour. Metab. Res., 1922, i., 497.
12. Goto, K., and Kuno, N.: Arch. Int. Med., 1921, xxvii., 224.
13. MacLean, H.: THE LANCET, 1923, i., 1041; and Medical Annual, Bristol and London, 1929, p. 126.
14. Hamburger, H. J., and Brinkman, R.: Biochem. Zeit., Berlin, 1918, lxxxviii, 97.
15. Cammidge, P. J., and Howard, H. A. H.: New Views on Diabetes Mellitus, London, 1923, p. 483.
16. Zuntz, N.: Arch. f. Anat. u. Physiol., 1895, p. 570.
17. Grote, L. R.: Verhandl. d. Deut. Ges. f. inn. med., 1921, xxxiii., 291.
18. Dünner, L., und Mecklenburg, M.: Zeit. f. d. ges. exp. Med., 1926, li., 513.
19. Goldberg, N.: Ibid., 1928, lix., 468.
20. Chiari, R., und Fröhlich, A.: Arch. f. exp. Path. u. Pharm., 1911, lxiv., 214.
21. Shapland, C. D.: THE LANCET, 1927, i., 758.
22. Voigt, C.: Ibid., 1927, ii., 916.
23. Lawrence, R. D.: Brit. Med. Jour., 1929, i., 196.

SELECTIVE ACTION OF X RAYS ON THE BLOOD CELLS OF THE CAT.

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THE changes in the cells of the blood which follow exposure to heavy doses of penetrating X rays have been studied in the cat. The entire body of the animal was irradiated at 57 cm. distance for varying periods, the spark gap being 10 cm. between spheres 5 cm. in diameter, 1 mm. of aluminium being the filter. In our experience if the duration of the irradiation is 75 minutes or over, death invariably results within 5 to 12 days; with exposures of 60 minutes a proportion of the animals survive; if the period is less than 60 minutes practically all the animals survive. In the experience of this laboratory, it takes 150 minutes' exposure to X rays of this type to kill, in vitro, the cells of Jensen's rat sarcoma (i.e., this dose equals 1 rad.).

The White Cell Count.

White counts made on a series of over 30 animals brought into the laboratory showed a wide range of variation, from 6000 to 35,000 per c.mm.; the usual range was from 9000 to 26,000. Considerable day to day fluctuations may occur in the same animal (see Figs. 1 and 2); large variations occur during the course of each day, commonly less than 5000, but sometimes as much as 9000. The differential count usually shows that the polymorph cells exceed 60 per cent., but sometimes the lymphocytes may preponderate.

Effects of Irradiation.—(1) The total white count may show a transient increase during the period of irradiation, but the figures obtained may be within the normal range of variation for the animal. The count then falls, as a rule steadily, sometimes with a slight transient recovery. On the third to the fifth day the white cells may have completely disappeared from the circulating blood or may be reduced to a few hundreds per c.mm. Following exposures of 75 or 60 minutes' duration this intense leucopenia persists till

death, which occurs 3 to 9 days later (Fig. 1). In animals which survive a 60 minutes' exposure, some recovery in the white count occurs on about the eighth or ninth day and this continues slowly with irregular fluctuations. With doses of 30 minutes, the total white count does not usually fall below 1000 per c.mm. and signs of recovery are shown early (Fig. 2).

(2) The lymphocytes decrease from the onset of the irradiation; the fall continues as a rule steadily, occasionally with a slight temporary recovery. On the second or third day the lymphocytes have practically completely disappeared from the blood, even with doses of 30 minutes (Figs. 1 and 2).

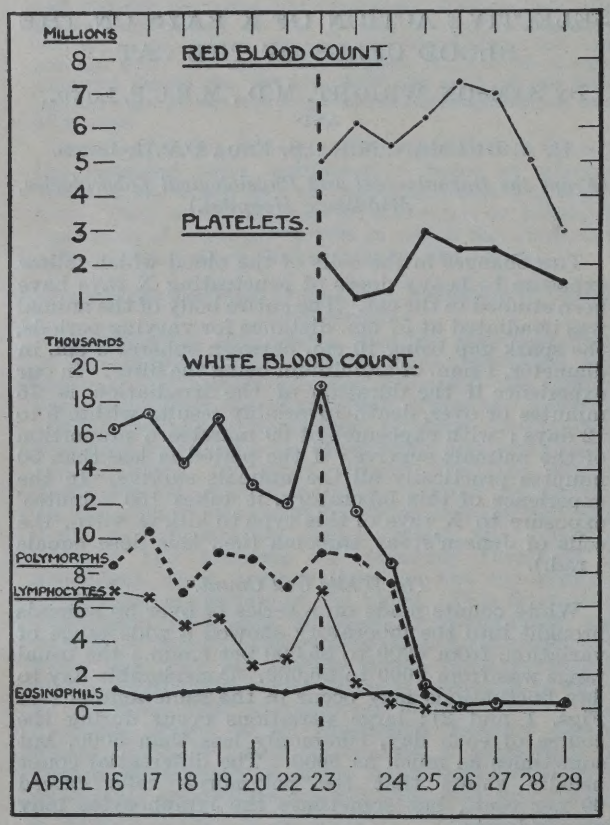
(3) The polymorphonuclear leucocytes may show a transient initial increase during the irradiation. The initial changes in the total white count depend on the extent to which this inconstant increase in the polymorphs outweighs the regular decrease in the lymphocytes. The polymorphs then decrease, but more gradually than the lymphocytes; on the third to the fifth day the polymorphs may be reduced to a few hundreds or less and constitute 95 per cent. or over of the total count. With doses of 30 minutes the polymorph count does not fall below 1000 per c.mm., and tends to recover more rapidly than the lymphocytes (Fig. 2).

The Red Cell Count.

The range of variation noted in the series of animals studied was 5 to 13 million per c.mm., the usual range being 7 to 9 million. The range of fluctuation in any individual animal is commonly 1 million, and may be as high as 3 million.

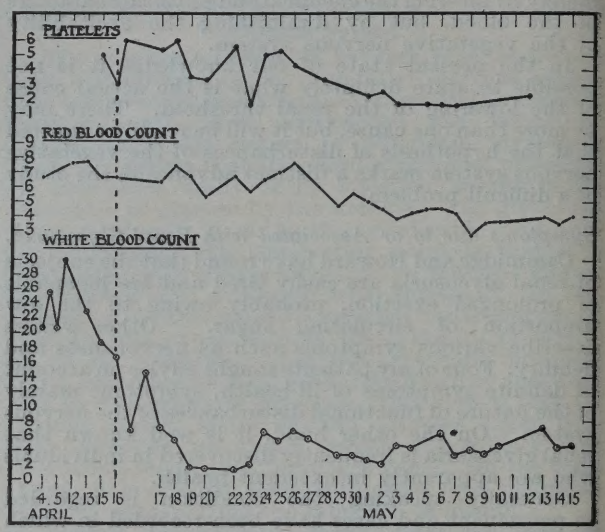
Effects of Irradiation.—The immediate effects are variable. There may be little change apart from the expected daily fluctuations (Fig. 2), or the count may rise for some days (Fig. 1), or show a steady mild decline (not illustrated). An increase in the total count is frequently associated with the appearance of many microcytes in the circulation. The red cells usually show crenation, poikilocytosis, and anisocytosis. With fatal doses a marked anæmia usually develops several days before death (Fig. 1). That this may be due to hæmolysis is suggested by the greenish tinge of the plasma which frequently gives a positive Fouchet reaction and a positive indirect van den Bergh reaction for bilirubin. The direct van den Bergh reaction in these cases was always negative. The acute anæmia may, however, result from widespread hæmorrhages.

FIG. 1.



Cat 49, X rayed for 60 minutes at point indicated by vertical dotted line. The animal was killed on the sixth day after irradiation, and culture of the heart's blood showed infection with *B. coli*. The portion of the chart to the left of the arrow shows the normal range of fluctuation of the white count. The red count shows an initial increase and a terminal acute decrease, the final figure being 3 million per c.mm. The platelets show irregular fluctuations and still numbered 1·5 million when the animal was killed. There is a progressive decrease in the total white count, which fell to 200 per c.mm. on the third day after irradiation and remained at about this level to the end. The lymphocytes (normal range 3200 to 7200 per c.mm.) fell to 250 per c.mm. 24 hours after irradiation; the polymorph and eosiniphil counts decreased more slowly.

FIG. 2.



Cat 45, X rayed for 30 minutes at point indicated by vertical dotted line. The general health and appetite were not much affected by this dose. The total white count fell to about 1000 per c.mm. on the fourth day after irradiation; slight recovery then set in, interrupted by temporary remissions. On the thirty-fifth day (not shown in chart) the count had risen to 7600 per c.mm. There was a rapid initial decrease in the lymphocytes and a more gradual decline in the polymorphs. During the recovery period the polymorph count exceeded the lymphocyte count. The red count showed irregular fluctuations (between 5·2 and 7·8 million for the first 12 days after irradiation.) From the fourteenth day the count steadily declined, the lowest value reached being 2·7 million on the twenty-second day. Slow recovery then set in; on the thirty-fifth day (not shown in chart) the count had risen again to 5·1 million, and on the 100th day it was 8 million. The platelet count before irradiation was between 3 and 5 million per c.mm. (citrate method). Observations made by the direct method for two weeks previously gave similar results (not charted). After irradiation the platelet count showed irregular fluctuations for 12 days and then sank steadily, the lowest value noted being 0·55 million per c.mm. on the twenty-second day; gradual recovery then commenced. On the 100th day the count had been restored to 3·5 million.

With non-fatal cases (Fig. 2) the development of the anæmia is more gradual, but is usually definite after 10 to 15 days. The count remains low for about two weeks and then recovery slowly sets in.

Platelets.

The range of normal variation noted in the small series studied is from 0·75 million to over 5 million. The latter figure is, of course, very much higher than that noted in man or the rabbit, but the counts have been made by two methods and repeated daily for many days so that we feel that they are substantially correct.

Effects of Irradiation.—(1) In animals that succumb the platelets have *not* shown any marked decrease before death. Thus cat 49 was killed on the seventh day when

t was very ill; blood culture was positive showing *Bacillus coli communis*, but the platelet count on that day was about 1·5 million (Fig. 1). Cat 53 died on the tenth day with a platelet count of 0·75 million (see protocol); post-mortem examination showed pus in the pleura and multiple abscesses of the lungs. This is contrary to the experiences of Cramer, Drew, and Mottram[1] with the rat, who found a marked decrease in the platelet count following gamma-radiation in animals that died of intercurrent infection.

(2) In animals that survive, the platelet count generally follows the same course as the red count. For the first 12 days irregular fluctuations occur; a definite decline is then noted (Fig. 2), which continues for a number of days. The count remains at a comparatively low level for some weeks and then recovery sets in.

PROTOCOL.—*Cat 53.*

Day in May.	R.B.C. in millions per c.mm.	W.B.C. per c.mm.	Platelets in millions per c.mm.	Plasma chloride.*	Remarks.
7th.	7·4	14,400	1·2	0·665	Coagulation time 7·5 min. Wt. 2360 g.
8th.	7·9	12,000	1·1	0·665	—
	Irradiate whole animal for 60 minutes.				
9th.	7·0	7,600	0·95	—	Coagulation time 2·5 min.
10th.	8·1	1,200	1·2	0·625	—
13th.	7·9	200	—	0·625	—
14th.	8·0	800	0·9	0·625	—
15th.	7·5	600	0·63	0·615	Poikilocytosis and anisocytosis. Many very small red corpuscles.
16th.	10·2	0	1·1	0·625	Red cells very crenated and empty-looking. Very many minute red cells.†
17th.	6·6	0	1·3	0·625	Crenation and poikilocytosis less. Small red cells no longer present.
18th.	6·2	0	0·75	—	Animal very ill.
19th.	—	—	—	—	Dead.

* g. NaCl per 100 c.cm. † Evidence in counting chamber of fragmentation of red cells.

The white count showed the usual decline; no white cells were visible from the eighth day onwards. The rise in the red count to 10 million on the eighth day was associated with intense poikilocytosis and anisocytosis and the appearance of numerous very small erythrocytes. The platelets showed irregular fluctuations and numbered 0·75 million before death.

The plasma chlorides (as NaCl) fell from an initial value of 0·665 g. per 100 c.cm. to 0·615 g.

Post-mortem examination.—Pleural cavities contained much pus; multiple abscesses of both lungs. The endocardium and pericardium were turbid; there was a hæmorrhagic effusion into the pericardial sac. Minute hæmorrhages in cortex of kidney, in the spleen, and in the mucous membrane and musculature of the small and large intestine.

Summary.

This paper illustrates the selective action of X rays on the blood cells of the cat. The doses of irradiation employed were definitely less than the lethal dose for Jensen's rat sarcoma cells, approximately ½ rad. or under.

The following is a summary of the more important changes observed.

(1) The lymphocytes are decreased early and markedly.

(2) The polymorphonuclear leucocytes after an inconstant initial increase, decrease more slowly and sometimes to a smaller extent.

(3) Marked changes in the red cell count occur later still: (*a*) in fatal cases, an acute anæmia develops in the final stages associated with evidence of hæmolysis or the presence of widespread hæmorrhages; (*b*) in non-fatal cases the anæmia develops very slowly and recovery is similarly gradual.

(4) The blood platelets are apparently unaffected in the cases that have ended fatally within a short time of irradiation, even when there is evidence of infection. In cases that survive the platelet count declines parallel with the fall in the red count, and then shows a gradual recovery.

These results form part of a more extensive research which will be published more fully elsewhere. We are deeply indebted to Prof. Sidney Russ for his advice and help throughout this work.

[1] Cramer, W., Drew, A. H., and Mottram, J. C.: Proc. Roy. Soc. B., 1922, xciii., 449.

Clinical and Laboratory Notes.

THE COLORIMETRIC ESTIMATION OF VITAMIN A.

BY THOMAS MOORE, D.Sc.

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THE original suggestion of Rosenheim and Drummond [1] that the well-known colour reaction of cod-liver oil with sulphuric acid was attributable to the presence of vitamin A has been approved with increasing confidence during the past eight years. More delicate reactions, notably with the antimony trichloride reagent,[2] have since been evolved, and by the use of a specially adopted form of the Lovibond tintometer [3] this reaction has been made the basis of a very convenient method of titration. The report of the Accessory Food Factors Committee published in THE LANCET [4] stated that in so far as concerns the grading of cod-liver oils the colorimetric method afforded information consistent with that derived from biological tests carried out in several independent laboratories. Drummond and Baker [5] have gone so far as to suggest that the vitamin may be assayed more accurately by colorimetric than by biological methods.

In other quarters, however, the specificity of the colour reactions has been questioned. On the one side Steudel and Peiser [6] have stated that the "vitamin" reaction is given by inactive crude cholesterol, while in the opposite direction Steudel [7] has also encountered a substance which although active in doses of 1·0 g., produced no colour reaction. These criticisms, although indicating certain difficulties which might arise in the application of the colorimetric technique, can be readily answered on theoretical grounds. For in the first instance chromogens derived from cholesterol may usually be readily distinguished from the vitamin chromogen by their inability to produce colorations when dissolved in natural oils; in the other direction very weak sources of the vitamin may produce colorations so faint as to escape observation unless the test is carried out on the unsaponifiable fraction rather than on the whole oil. Further criticism of the specificity of the reaction has been put forward by Hawk,[8] who has claimed that the chromogenic value of cod-liver oil may actually increase in samples exposed to climatic conditions calculated to cause destruction of the vitamin. Jones, Briad, Arzoomanian, and Christiansen[9] have also reached a similar conclusion, having found that in certain samples of cod-liver oil the colorimetric assay might exceed the biological assay by as much as 600 per cent.

Recently Euler and his co-workers,[10–16] who in a series of papers have claimed that vitamin A activity is not the property of a single substance, but may be possessed by several carotinoids or "polyenes," have indicated certain other objections to the general application of the colorimetric method of estimation. Different "polyenes" have been found to give colour reactions with varying intensity and shade, and no correlation has been found between the

intensities of the colorations produced and the activity of the various polyenes. Certain polyenes—xanthophyll, lycopin, α crocetin, bixin and capsanthin—have, in fact, been found to produce colorations, although biologically inactive. Colorimetric data can therefore only be used as a basis of comparison when they are given by the same "polyene," or by a mixture of "polyenes" in constant proportions.

Preliminary experiments by the writer in confirmation of the claim that recrystallised carotin may possess intense vitamin A activity have already been mentioned in THE LANCET.[17] In view of the work of Duliere, Morton, and Drummond,[18] who have found after very thorough purification the pigment (M.P. 184·9°) becomes much less active, the main question of a possible relation of vitamin A to carotin must for the time being present a very open aspect. Nevertheless, the chromogenic properties of such samples of carotin (M.P. 174°) as have been found in my experiments to be consistently active, and also of the colourless inactive products which may be derived from them by mild oxidation, must be of immediate practical interest in illustrating certain difficulties which stand in the path of a universal application of the colorimetric technique.

It will be recalled that the well-known reaction of cod-liver oil with antimony trichloride is characterised by an absorption band at about 610 μμ, and until the discovery of the activity of carotin samples it seemed probable that the danger of the simulation of the test by casual inactive bodies could be ruled out by a spectroscopic confirmation of the position of the absorption bands. With highly active samples of carotin, however, the shade of colour produced is noticeably duller and more green, and is characterised by the appearance of an absorption band at 590 μμ. Any trace of the 610 μμ band, if present, is too weak to be detected, although judging by the biological activity well marked adsorption at this position would be expected. Vitamin A activity cannot therefore be restricted to materials producing adsorption at a specific position. Is the production of a blue coloration of any shade a sign of vitamin A activity?

In addition to the findings of Euler, experiments by the writer on the oxidation of carotin prove that this is not the case. When carotin in chloroform solution was treated in the cold with benzoyl peroxide[19] an almost complete bleaching was effected, which was accompanied by disappearance of physiological activity. Nevertheless it was found that the chromogenic value remained unaltered, and in common with vitamin A a transient blue coloration was still given even after dissolving the reaction products in arachis oil. In this case, therefore, a colorimetric assay of vitamin activity by the tintometer method would have furnished a completely deceptive result. Subsequent spectroscopic examination disclosed that the absorption band attributable to the original carotin was no longer in evidence. Selective absorption was much less clearly defined but appeared to be mainly at about 640 μμ.

The above results lend force to the suggestion of the Accessory Food Factors Committee that before a conclusion can be drawn as to the general validity of the colorimetric method of assay, tests should be made on substances other than cod-liver oil which contain vitamin A, such as butter, palm oil, cereal oils, &c. While the colour reactions of cod-liver oils, confirmed by rigid spectroscopic tests, probably provide a reliable means of estimation, the colour reactions of vegetable extracts and of some less familiar animal sources remain an almost unexplored field. Who would care to predict on purely colorimetric data whether cayenne pepper or an extract of boiled lobster shells (both rich in carotinoids) would prove effective as a source of vitamin A?

For the present it seems safe to assume that materials which give no blue coloration with antimony trichloride, even after the removal of saponifiable matter, must be devoid of vitamin A activity. Materials of liver oil origin giving colour reactions characterised by absorption at 610 μμ may be considered active. But, on the other hand, materials which give colour reactions characterised by absorption at other positions may be either active or inactive, or mixtures of inactive and active chromogens, and the biological technique still remains the only satisfactory method of assay.

References.

1. Rosenheim, O., and Drummond, J. C.: THE LANCET, 1920, 862.
2. Carr, F. H., and Price, E. A.: Biochem. Jour., 1926, xx., 497.
3. Rosenheim, O., and Schuster, E.: Ibid., 1927, xxi., 1329.
4. Accessory Food Factors Committee, THE LANCET, 1928, i., 148.
5. Drummnod, J. C., and Baker, L. C.: Biochem. Jour., 1929 xxiii., 274.
6. Steudel, H., and Peiser, E.: Zeit. Phys. Chem., 1923, clxxiv., 191.
7. Steudel, H.: Biochem. Zeit., 1929, ccvii., 435.
8. Hawk, P. B.: Science, 1929, lxix., 200.
9. Jones, W. S., Briad, A. E., Arzoomanian, S., Christiansen, W. G.: Jour. Amer. Pharm. Assoc., 1929, xviii., 253.
10. Euler, B. v., and Euler, H. v.: Svenk Kemisk Tidskrift, 1928, xl., 242.
11. Euler, B. v., Euler, H. v., and Hellstrom, H.: Ibid., p. 256.
12. Same authors: Biochem. Zeit., 1928, cciii., 370.
13. Karrer, P., Euler, B. v., and Euler, H. v.: Arkiv. för Kemi, Mineralogi och Geologi, 1928, x., No. 2.
14. Euler, B. v., and Euler, H. v.: Ibid., No. 3.
15. Euler, H. v., Rydbom, M., and Hellstrom, H.: Biochem. Zeit., 1929, ccviii., 73.
16. Euler, B. v., Euler, H. v., and Karrer, P.: Helv. Chem. Act., 1929, xii., 278.
17. Moore, T.: THE LANCET, 1929, i., 499.
18. Duliere, W. L., Morton, R. A., and Drummond, J. C.: Chem. and Ind., 1929, xlviii., 318.
19. Pummerer, R., and Rebmann, L.: Ber. d. Deut. Chem. Ges., 1928, lxi., 1099.

AN UNUSUAL CASE OF URINARY FISTULA.

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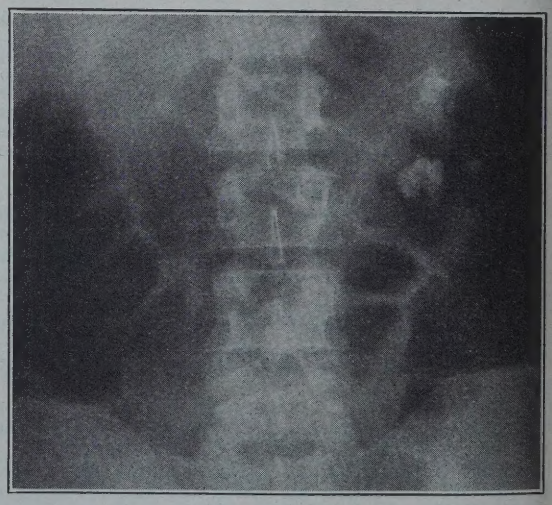
MODERN methods of diagnosis are so reliable that the end-results of neglect are rarely seen, and therefore the following case is interesting.

In February, 1929, a tribesman, aged 36, was referred to me on account of a discharging sinus in the upper part of his left

FIG. 1.



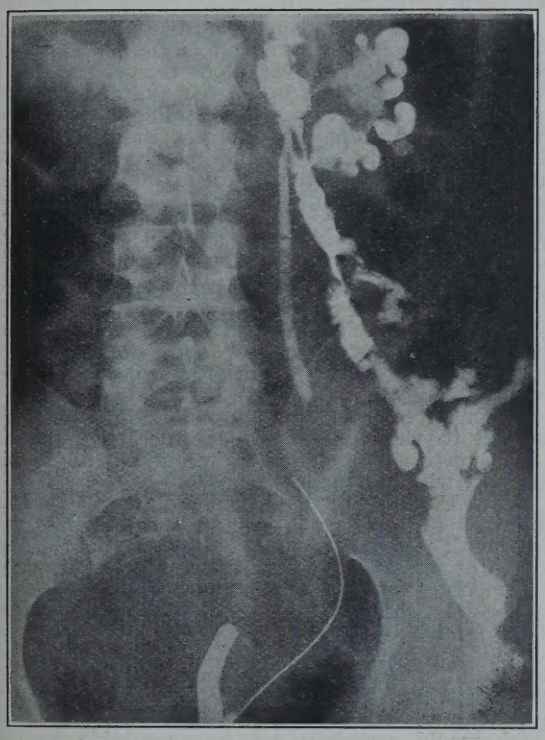
Calculi in the left kidney.

thigh. He gave a history of an attack of pain in the left iliac fossa four years previously; this had occurred every spring. Nine months earlier a swelling had appeared in the upper part of the thigh, and this had been incised by his

doctor and a discharging sinus had resulted. Periodically he had noticed a thick deposit in his urine, but no blood was ever present.

The discharging sinus was situated in Scarpa's triangle, immediately below the centre of Poupart's ligament, and had

FIG. 2.



Opaque emulsion in the fistula. Catheter in the left ureter.

an orifice large enough to admit a No. 10 catheter. A probe passed without meeting any obstruction, running upwards and backwards for a distance of 5 inches. The vertebral column and hip-joint appeared normal. In the region of the left kidney, although the organ was not tender, there was a slight fullness which drew attention to it. The urine contained large quantities of pus. X ray and cystoscopic examinations were made, and the accompanying figures illustrate the condition. Fig. 1 shows the presence of renal calculi in the left kidney. Fig. 2 shows a ureteric catheter in the left ureter, arrested at the brim of the pelvis. An opaque injection has been made into the fistula and, having reached the kidney, is descending the ureter to a point a short distance proximal to the tip of the catheter, but in a more medial plane. A further radiogram showed a later condition in which the opaque emulsion, having traversed the "S" shaped course taken by the ureter was running down the ureter alongside the catheter.

The left kidney was explored by the usual approach. It was found fibrosed, half the normal size, and densely adherent to the surrounding structures. Numerous calculi could be felt. Owing to the adhesions to peritoneum and viscera, a nephrectomy was impossible. As decapsulation also proved unsuccessful, the kidney was split from pole to pole, and six calculi removed. A thick fibrous cord was felt joining the pelvis of the kidney at the junction of the inferior calyx, and on removal of a calculus from this calyx a large quantity of pus welled up. No normal tissue could be demonstrated in the kidney, which was left open and drained. Two months after operation the sinus had closed, the nephrotomy wound healed, and when the patient was discharged he had no symptoms and had gained weight.

My explanation of the sequence of events which led to the condition found at operation is that, owing to delayed diagnosis, the chronic inflammation caused such dense adhesions that an abscess formed within the psoas sheath and tracked down to Scarpa's triangle.

BRITISH MEDICAL ASSOCIATION.

ANNUAL MEETING IN MANCHESTER.

PROCEEDINGS OF THE REPRESENTATIVE BODY.

(Concluded from p. 197.)

Heroin: An "Oppressive Restriction."

THE Dangerous Drugs Acts, and especially the new regulations about heroin, produced a crop of protesting resolutions, and Dr. J. W. BONE took the opportunity to explain how the situation had arisen. The Act of 1920, he said, under which the profession had worked quite happily, required that practitioners should keep a record when prescribing drugs containing more than 0·1 per cent. of morphine or heroin, or 0·2 per cent. of cocaine or opium. In 1925 Great Britain pledged herself at Geneva to apply the Dangerous Drugs regulations to all preparations of heroin, of whatever strength, and this provision of the 1925 Act came into force on Jan. 1st of the present year. The Association had actively objected to it in 1925 and was still in correspondence with the Home Office. Sir Malcolm Delevingne's principal argument now seemed to be that nothing could be done in face of the international agreement, but in point of fact the Convention stipulated that the requirement to enter the quantities distributed need not necessarily apply to supplies dispensed by medical practitioners or to sales by duly authorised chemists. Unfortunately, the Act of 1925 which applied the Convention to this country contained no such proviso and said definitely that any strength of heroin must be recorded. Dr. Bone had always thought this an oppressive and unnecessary restriction on medical practice and at last he was finding wide support for his views. He thought the meeting might well suggest that legislation to amend the Act in this sense should be encouraged. It was commonly said, he added, that Great Britain was the only country which had honourably tried to carry out the terms of the Convention and that the United States had taken no steps to ratify it. America was, however, in a fair way towards cutting heroin out of the pharmacopœia of every doctor; and with good reason, for in the States heroin addiction was undoubtedly a serious problem and justified measures which he saw no reason to enforce in this country.

Dr. R. M. MANWARING-WHITE spoke of the great value of heroin in such conditions as dry irritable cough, and suggested that its use might be diminishing under the present exacting restrictions. He understood that there were practically no heroin addicts in this country.

Dr. JOHN STEVENS held that there was no reason for extending the restrictions to this valuable drug for which there was no really adequate substitute—and proposed for Edinburgh and Leith a motion which strongly supported the Council "in its effort to obtain amendment of Section 3 of the 1925 Act," and recommended that "heroin and its salts should come under the same conditions as morphine and its salts." This motion was passed by the Representative Body, with the following addition made at the instance of Dr. F. TEMPLE GREY:—

Also that the Council should on all possible occasions urge the Government not to enter into international conventions involving medical questions until the opinion of the medical profession has been ascertained.

Dangerous Drugs and Record-keeping.

Dr. STEVENS got little support for his complaint that it is impossible for a practitioner to have his stock of dangerous drugs under lock and key and at the same time have them available for inspection in his absence, but a discussion arose on the third proposition which he brought forward for his Division.

The Regulations say that no record need be kept when a drug or preparation is administered by, or under the direct supervision and in the presence of, a doctor. Dr. Stevens suggested that a similar

exception might be made when it was administered "under his authority given to a nurse or other responsible person."—Mr. DAVID LEES supported this proposal on the ground that it provided an alternative to the present system under which a medical man might prescribe 50 or 100 tablets and send them to a nursing home where they could be used ad lib. by the patient.—Dr. F. RADCLIFFE said he understood that if nurses in a home administered doses of morphia and entered these doses in a book, kept at the home, this would cover what the doctor had ordered by lots of 50 or 100.—Dr. BONE, in reply, described the practice mentioned by Mr. Lees as quite irregular, and made it clear that a record must certainly be kept if a dose is given in the absence of a doctor. In the case of a hospital or nursing home a book must be provided for the purpose by the institution; where, on the other hand, the drug is given by a nurse to a patient in a private house, the practitioner who has supplied it must enter the doses on his own register.

The amendment proposing an alteration in this rule was lost by a large majority.

Relation of the Private Practitioner to the Public Health Services.

Last year the Representative Body viewed with concern "the insidious inroads continually being made on private medical practice under the auspices of the State, voluntary bodies, and others," and recorded its opinion that "the increasing tendency to transfer the treatment of many diseases and conditions to whole-time medical officers" is detrimental to the public health. Dr. Alfred Cox, the Medical Secretary, has since reported personal investigations into the working of maternity and child welfare centres and school clinics, and the Council has prepared an elaborate report whose conclusions and recommendations were presented to the meeting by Dr. BONE.

After stating that the main sphere of the private practitioner is the giving of medical advice and treatment to individuals, whereas the main sphere of the public health officer is the promotion of healthy conditions for the community, the Council goes on to point out that there is no definite line of demarcation between these spheres and that in both there is need and opportunity for clinical and preventive work. So far as possible the private practitioner and the medical officer should associate themselves, and be interested in, each other's work; nevertheless "the general direction of services established by or under the auspices of the local authority should be entirely within the province of the public health medical officer; and equally no clinical work should be undertaken by public health medical officers which can, with due regard to administration, be done as well by private practitioners." The profession, says the Council, recognises the propriety of central departments and local authorities making provision for medical advice and treatment, but public centres and clinics should not be developed in such a way as to militate against or interfere with suitable developments of a contributory National Health Insurance scheme for the appropriate sections of the population.

> "The work of such clinics should therefore be primarily directed to education in the general rules of health and of hygiene; medical or surgical advice or treatment for the individual should be confined (*a*) to such treatment as can be actually given therein, and should not include any treatment that makes domiciliary attendance advisable or involves a stay of more than 48 hours at any clinic where beds are provided; and (*b*) to those patients who are unable for some reason to obtain treatment from a private doctor and those who, as a result of supervisory medical work undertaken by the local authority, are discovered to be ailing, and for whose ailments treatment would not be sought unless it were provided by the local authority."

The question of the existence of a family doctor, or of the possibility of securing one, should be raised, the Council maintains, in respect of every case attending a clinic, and such officers as health visitors and midwives should be actively discouraged from sending direct to a clinic any cases which can be dealt with privately. The question how far private practitioners can undertake the work of the clinics should be seriously considered in each locality in conference with local practitioners, and wherever practicable "all medical advice and treatment at local clinics should be given on a part-time basis by private practitioners, whether it is within the sphere of general practice or whether it is of a specialist character." Those who accept such service must, it is emphasised, be genuinely interested in the work they undertake to do and must look on it as the first call on their time.

Dr. EUSTACE HILL, supporting these recommendations, cited instances in which maternity and child welfare work was very well done by private practitioners on a part-time basis, but pointed out that some medical men did not like sending their patients to clinics run by other doctors practising in the same district. The work of a welfare centre was seriously interrupted if a practitioner failed to attend because he was looking after his own affairs, and it could not be conducted on this basis. Despite undoubted administrative difficulties Dr. Hill felt that part-time work had many advantages.—Dr. E. R. FOTHERGILL spoke of the revolutionary changes in medical work since the beginning of the century, and said that the Council was hoping to present to the next Representative Meeting an ideal scheme for medical service in this country, showing the lines further changes ought to take.

A number of details arising out of the report were referred to the Council for consideration, but the conclusions and recommendations outlined above were accepted without much discussion.

Dr. C. FORBES, for Aberdeen, proposed "That the functions of the health visitor and district nurse could with advantage be fulfilled by one and the same person or public nurse; and that this public nurse, for purposes of domiciliary health education and propaganda, should be under the immediate direction of the family doctor, where such exists." This plan, he said, had been successfully tried in Aberdeenshire. But it did not commend itself to the Representative Body, and Dr. EUSTACE HILL described it as an encroachment on the sphere of preventive medicine which would certainly not be acceptable to local authorities in England.

Reform of the Poor-law.

Dr. BRACKENBURY reminded the meeting that under the new Local Government Act the councils of counties and county boroughs were now preparing schemes for carrying out the functions which would be transferred to them next year. If they liked to do so these councils could go a long away towards getting unified public health services. On the other hand, they need not. The Association was anxious to get them to break up the poor-law so far as they were able and use their other legislative powers instead. It also felt that the work would not be done as efficiently as possible unless medical men and ex-guardians were coöpted as members of the new poor-law committtees. The Council of the B.M.A. was therefore scrutinising the schemes as they appeared. There was a very unfortunate circumstance, however, which made one section of the Act almost a farce. It was laid down that the schemes had to be submitted by Sept. 27th, and as most of the councils did not meet in August or September the result was that many had already been published, whilst many others would appear shortly. The schemes were open to criticism for only four weeks after publication, and the effect of submitting them at this time of year was to prevent their consideration by local district councils or by central bodies such as the B.M.A. This had certainly not been the intention of Parliament, and he appealed to local authorities to defer the actual submission of their schemes until the last possible day.

Dr. Brackenbury also referred to Section 13 of the Act, which says that before making any additional hospital provision, or any different use of transferred hospitals, local authorities must consult any body which they regard as representing the voluntary hospitals of their area—including both the medical

staffs and the governing bodies. It was highly important that in every area there should be such a body and the Council earnestly asked members of the profession to take immediate steps to promote the formation of these consultative committees. If there were cottage hospitals in the district they too should be represented.

Representation of Profession on Local Authorities.

Speaking on another section of the Council's report Dr. BRACKENBURY pointed out that more and more members of the medical profession were being drawn into contractual relation with the work of the local authorities. This meant that more and more were being legally deprived of the right to take part in public health work as members of those authorities. The Local Government Act would greatly swell the numbers of those whose medical experience could not be placed at the disposal of the community, and the Ministry of Health realised that this was not in the public interest. It was interesting to note that teachers were not debarred from belonging to education authorities, and were indeed obliged to send representatives.—In the course of a brief discussion on this topic a representative said that he had two partners, one of whom did part-time work at a public clinic. Because of this appointment all three members of the firm were prevented from taking any part in the government of their town.

Representation of Profession in Parliament.

So much non-controversial talk proved a little enervating, and everyone brightened up noticeably when asked to destroy the Association's Parliamentary Elections Fund. The CHAIRMAN and the meeting amiably accepted an assurance from representatives of the press that they would observe their usual discretion in suppressing names and details, after which Dr. E. K. LE FLEMING entered on an account of the Fund's recent history. It had proved impossible he said, to support any Labour candidate at the general election principally because the Labour Party still held by nationalisation or municipalisation of all hospitals and the ultimate establishment of a whole-time salaried State medical service. As stated in the published report of the Council, approval and support had been given to the candidature of two members of each of the other parties—namely, Dr. J. H. Morris-Jones (Lib.), Dr. A. Vernon Davies (Cons.), Dr. J. Vincent Shaw (Lib.), and Dr. L. Haden Guest (Cons.), all of whom expressed themselves as in favour of the Association's policy. The two former had been elected. The Fund, said Dr. Le Fleming, had not been too well supported, but after much thought he had come to the conclusion that it served a useful purpose. It was valuable to have in the House medical men who could accurately represent the views of the profession as set out in the policy of the B.M.A.

Dr. FOTHERGILL, proposing for Brighton that the Fund, having failed of its purpose, should be wound up and that the money should be used for cognate purposes, said that legislation was now done in Whitehall, not at Westminster. An M.P.'s duty was first to his party, then to his constituents, and then to his profession. Some would put conscience first; in a few instances this might be so. At any rate, the Association was already in a position to approach the central authorities at Whitehall and the local authorities elsewhere, and it could best gain its ends in this way.—Mr. BISHOP HARMAN also wanted to kill what he described as "this untimely child," and the proposal got further support from Dr. PETER MACDONALD, despite (he said) the arguments advanced in its favour.

Sir RICHARD LUCE said he had always been opposed to the Fund and had never been ready to take anything from it. After a man's duty had been done by conscience, constituents, and party—in that order, he thought—what then was left? A Member of the House who was paid to represent some outside body—that was what it came to—was liable to the taunt that he went there to represent special interests. To be in such a position was unpleasant, especially to a professional man. Anyone familiar with medical work would be listened to in Parliament with respect and attention, but he would have nothing like the same influence if it was recognised that he was there to support the interests of his profession. Sir Richard did not believe, moreover, that the Fund had ever got a man in who would not have been elected without its help.

Dr. D. F. TODD spoke of the educative effect of having medical men in the House. They went not to represent the profession directly, but to represent the community.—Dr. S. MORTON MACKENZIE wanted to let the Fund go on, and so did Mr. MCADAM ECCLES.—Dr. BRACKENBURY said it had failed financially, but in a more modest form was an essential part of the machinery; Dr. TEMPLE GREY pleaded for its abolition; Dr. LE FLEMING replied in its defence; and eventually Dr. FOTHERGILL'S resolution to wind it up was put to the meeting and defeated.

A Medical Ophthalmic Service.

As there is little likelihood of any draft regulations about ophthalmic benefit being issued in the near future the Council has agreed that the National Ophthalmic Treatment Board shall put into operation a scheme for an ophthalmic service approved by the Representative Body last year.

By arrangement under this scheme, it is stated, insured persons and their dependents may have their eyes examined "by an ophthalmic medical practitioner at his private consulting room," and obtain spectacles, at an inclusive fee of 18*s*. Arrangements have also been made whereby non-insured persons who cannot afford the ordinary fee and whose family income does not exceed £250 a year, may take advantage of these facilities. The spectacles will be supplied by members of the Association of Dispensing Opticians, who practise no sight-testing. The scheme will be administered by a National Ophthalmic Treatment Board comprising representatives of this association and of the B.M.A.; the Minister of Health, and approved societies are also being invited to send nominees. Particulars may be had from the general secretary of the Board at 1, High-street, Marylebone, London, W. 1.

Dr. R. WALLACE HENRY (chairman of the Ophthalmic Committee) said he believed the scheme would be found quite workable, and Mr. BISHOP HARMAN described it as a really valid attempt to cater for one of the great needs of civilisation. He believed it would be adopted by public authorities and other organisations to the great advantage of the public.

Vaccination.

Newcastle tabled a resolution demanding that "Government lymph should be available for all practitioners and that every general practitioner should be able to vaccinate his own patients in the same way as public vaccinators, and obtain similar remuneration from the Government." Bath wanted the meeting to pass a statement that—

The Representative Body views with concern the spread of small-pox in this country and the difficulty of ensuring adequate vaccination of the public; that one of the reasons for this inadequacy of protection is the uncertainty of certain preparations of vaccine lymph; that sometimes these fail to produce reactions and vaccinated persons acquire small-pox, at other times the reaction is so severe that the health of the patient is seriously affected; that experience shows that these objections do not apply to Government lymph, but this is not available for other than public vaccinators, and in the case of immediate contacts for medical officers of health; and that the Representative Body urges the Council to represent to the competent authorities that vaccination cannot be properly promoted unless they are prepared to provide Government lymph to private practitioners (if necessary on payment) or to give a Government guarantee of efficiency to supplies of lymph prepared by private firms.

In 1923 the Minister of Health told the Association that he understood there was no difficulty in obtaining supplies of glycerinated calf lymph from reputable firms, that the Government Lymph Establishment was established to provide lymph for the primary vaccination of infants by Government vaccinators, and that the supply of such lymph to doctors would

involve a large and costly extension of the present supply for which he saw no need.

This statement, which has since been repeated several times, was criticised for Bath by Dr. R. G. GORDON. It was time, he said, that everyone woke up to the fact that the incidence of small-pox was becoming serious. The lymph obtainable from reputable firms was sometimes ineffective and sometimes drastic in its action. He would say nothing about post-vaccinal encephalitis, because our present knowledge did not justify dogmatic statements about it. It was recognised, however, that on the whole Government lymph gave relatively constant results, and at a time when small-pox and the disuse of vaccination were both increasing it was surely not too much to ask that a supply of such lymph should be available.—Dr. MIDDLETON MARTIN thought that the grave difficulties in the way of getting the public to appreciate the importance of vaccination should be combated by encouraging practitioners to use their influence in the home. He hoped that further facilities would be provided.

In the subsequent discussion a public vaccinator was quoted as saying he had never had a failure with Government lymph in 21 years—whereas lymph from a private firm might give as few as 25 per cent. of "takes"—and Dr. W. N. WEST-WATSON said he had been struck by the small proportion of successful results with the lymph he had been using recently.—Dr. B. H. PAIN said that when some years ago he proposed in the *Times* that every medical man should vaccinate his patients at the cost of the public an inspector from the Ministry informed him that this would be expensive and would involve placing practitioners under supervision. Accurate records had to be kept so that if anything went wrong the lymph could be traced to its origin.

Dr. BRACKENBURY recommended caution, if only because there were members of the Association whose livelihood depended on the private manufacture of lymph. When vaccine proved ineffective complaint should be made to the Therapeutic Substances Act Advisory Committee.—The CHAIRMAN (Dr. Hawthorne), as a member of that committee, said that there were inspectors under this Act just as under the Food and Drugs Act. Though these inspectors examined samples of lymph as part of their duties, their procedure would doubtless be hastened by specific complaints.—Dr. C. E. S. FLEMMING maintained that if this Act controlled the preparation of lymph, then its control was inadequate. A number of people in his district had been made seriously ill by vaccination, and this had naturally affected public opinion adversely.

Dr. J. B. MILLER said that the general practitioner, who had to take the responsibility of advocating vaccination, ought to be able to feel confident in the lymph used for the purpose. Dr. Miller did not regard official supervision as a hardship; but Dr. E. LEWYS-LLOYD (Chairman of the Public Health Committee) remarked that if anyone was under the impression that the record-keeping and inspection of public vaccinators were nominal, he was making a mistake. In Dr. Lewys-Lloyd's opinion the Therapeutic Substances Act did give a guarantee, and if any sample of lymph was inefficient the machinery of this Act should be set in motion.

Ultimately the proposed resolutions were referred to the Council for consideration.

A State Medical Service: Possible Unsoundness of the Young.

Bearing the arms of Kensington Mr. E. B. TURNER entered the lists with a motion condemning the project of a whole-time salaried State medical service and calling on the Association to educate and organise its members to resist any legislative attempt to set one up. The proposal would either have to be fought or allowed to go by default; and he was all for fighting. If the profession felt about it as he did, then steps should be taken to form opinion. There was a large body of younger men whose outlook was largely bounded by contract practice, and who would easily be lured into a State medical service. "Si vis pacem, para bellum," said Mr. Turner—apparently unaware that the sentiment is out of fashion.

Dr. BRACKENBURY was almost scornful. The motion had an air of panic. If one thing was certain it was that the whole medical profession was fully decided that it would not work a whole-time medical service.—And did Dr. Brackenbury remember, asked Mr. TURNER, how sound and solid the profession had been about national insurance? How 27,000 practitioners had said they would not go on the panel till the B.M.A. took away its embargo, and how they flocked to do so before that embargo was removed? Would it not have been better then not to have passed quite so many unanimous resolutions at crowded meetings, but rather to have considered and discussed the views of the silent minority?

Dr. H. S. BEADLES did not believe the profession was "solid" at all. He thought many young men would willingly join a whole-time service, though they would not be wise to do so.—The same view was taken by other representatives, one of whom spoke of an "enormous number" of men who wanted such a service.—Mr. BISHOP HARMAN said this was absurd; 99 men out of 100 had spunk enough not to prefer whole-time salaried work to the adventure of practice.—Dr. C. E. S. FLEMMING suggested that the best way to meet this talk about a State medical service was to formulate a comprehensive scheme in its place, as the Council hoped to be able to do next year.—Finally a member who rashly compared the advantages of private practice and public work was eliminated by Dr. BRACKENBURY, who said that such comparison had nothing to do with the case. What the Association had always set its face against was not the public health service, but rather the stereotyping of ordinary family practice into the form of a State medical service. In favour of this, he repeated, there was *no* considerable body of medical opinion.

Not much more was said on this subject. Rejecting Mr. TURNER'S motion for mobilisation, the meeting contented itself with reaffirming its former convictions on the subject of a State medical service.

Need of Superannuation Schemes for Medical Officers.

Arising out of the case of the late tuberculosis officer for Gateshead, who is believed to have contracted encephalitis lethargica from a patient in the course of his duty and on losing office received no compensation in spite of steady pressure on the local authority concerned, Dr. R. FORBES for Gateshead proposed:—

> That . . . it be an instruction to the Council: (*a*) to take such action as it deems necessary to urge local authorities to adopt superannuation schemes under which the medical officers and their staffs would benefit. (*b*) To make strong representation to all local authorities that where a medical officer is disabled permanently or with fatal results, through contact with infectious diseases, and where his disability is directly traceable to his work in this respect the dependents of the practitioner should be suitably compensated for the loss involved.

Describing the case as one of great hardship, Dr. Forbes said that a medical officer who was required to stand between the community and infectious disease ran a rather special risk, and it was not too much to ask that the community should compensate him or his dependents.—The motion was carried.

Remuneration of Poor-law Medical Officers.

Attention was drawn by the North of England Branch to the deplorable conditions of service under which poor-law medical officers are at present working in areas where unemployment is rife.—Dr. R. FORBES said that the question was national rather than local, but Dr. BRACKENBURY replied that the Council, while fully aware of the misfortunes of these officers on Tyneside must also take into account the fact that in many parts of England medical men would be sorry to have the terms of their service

reviewed. The following motion by Gateshead was approved :—

That the Representative Body, recognising that poor-law medical practitioners will shortly become the servants of a new authority, considers that the time is now opportune to explore the status and remuneration of these officers, and instructs the Council to examine the whole matter and take such steps as are necessary to secure equitable terms of service and adequate remuneration for the work involved.

Other Subjects Discussed.

The meeting agreed to the two following proposals of the Council :—

That the Representative Body reaffirms the opinion it expressed in 1924 that the General Medical Council and the profession generally have acquiesced in the custom, now of long standing, of advertising in the lay press, nursing homes, sanatoria, and hydropathic institutions, and feels that, in any policy formulated by the Association, regard must be had to this custom ; and further that the R.B. takes no exception to the association of registered medical practitioners with an institution for the treatment of patients by physio-therapeutic and electrical methods, provided the following essential conditions are strictly conformed to : (*a*) That the institution is not in any way advertised to the lay public ; (*b*) that the treatment of all patients is under the direct control of a registered medical practitioner who accepts full responsibility for their treatment ; (*c*) that the relation between the medical officer of the institution and private practitioners conforms to the usual ethical procedure between consultant and private practitioner.

That the following Clause 1 (1) of the Preservation of Infant Life Bill (as sent from the House of Lords to the House of Commons) be approved :—1.—(1) Subject as hereinafter in this subsection provided, any person who, with intent to destroy the life of a child capable of being born alive, by any wilful act causes a child to die before it has an existence independent of its mother, shall be guilty of felony, to wit, of child destruction, and shall be liable on conviction thereof on indictment to penal servitude for life ; provided that no person shall be guilty of an offence under this section unless it is proved that the act which caused the death of the child was not done in good faith for the purpose only of preserving the life of the mother.

Dr. ELEANOR LOWRY, for Marylebone, proposed a motion (which was carried) deploring " the insufficient provision which exists for the administration of the beneficent provisions of the Mental Deficiency Acts " and assuring the Minister of Health of the support of the B.M.A. in urging the local authorities to meet the grave need for institutional care.—Dr. H. C. BRISTOWE spoke strongly of the extent of this need, and Dr. A. HAWKYARD mentioned that unfortunately attempts to get defectives into institutions were often hampered by members of the medical profession whose only object sometimes seemed to be to get their patients off. There was very little knowledge of the Acts among practitioners.

Dr. TEMPLE GREY proposed for Marylebone that " communications between doctor and patient, unless they concern fraud or crime or otherwise the public interest, ought to be privileged from disclosure in courts of law." The extreme view of the sanctity of medical privilege was, he said, not the medical but the social view. The public would demand medical privilege as soon as they realised that it was *their* secrets which were being given away.—The motion was referred to the Council.

On the report of the Organisation Committee Dr. MORTON MACKENZIE said that whereas there were only 1852 women medical practitioners in this country in 1922, the number in July of this year was 4259, of whom about two-thirds were members of the Association.

The Council's negotiations towards the establishment of an international medical sea code were approved. Dr. BONE said that the Board of Trade hoped to be able to make good use of the code proposed.

The General Medical Council.

It was announced that at the forthcoming election of Direct Representatives of the profession on the General Medical Council the candidature of Dr. H. B. Brackenbury and of Mr. N. Bishop Harman would be supported by the Association.

The CHAIRMAN and others referred in very warm terms to the work of Sir Jenner Verrall, who is resigning from the G.M.C. after over 18 years' membership. A resolution of deep appreciation of his services was placed on record.

THE ANNUAL GENERAL MEETING.

On July 23rd the retiring President, Sir Ewen Maclean, invested Prof. A. H. Burgess with his badge of office, after which the Chairman of Council, Dr. Brackenbury, invested Sir Ewen with the new past-president's badge. In reporting that the Representative Body had elected Dr. W. Harvey Smith, professor of ophthalmology in the Manitoba Medical College, as President for 1930–31, Prof. Burgess said that the last meeting of the Association held abroad was at Toronto in 1907, and that the next would be at Winnipeg in 1930 under Prof. Harvey Smith's presidency. The treasurer, Mr. Bishop Harman, formally presented the new symbolic staff which he has given to the Association.

At the adjourned annual general meeting later in the same day the President delivered the address which we published last week. He presented the Sir Charles Hastings clinical prize to Dr. Arthur Crook, of Norwich, the Hempson prize to Dr. A. C. T. Perkins, of Bury St. Edmunds, and the Middlemore prize to Mr. W. S. Duke-Elder.

THE RELIGIOUS SERVICE.

The Bishop of Manchester, the Lord Mayor of Manchester, the Mayor of Salford, the Chancellor and Vice-Chancellor of the Victoria University, and officials of the Association attended the service in the Cathedral on the 23rd. The Archbishop of York was the preacher. In the course of his sermon Dr. Temple suggested that the advance of science was liable to create a sense of insignificance in mankind and thereby might operate against the sense of responsibility which was one necessary part of the religious man's existence. Yet it was part of all religions that every moral choice made by human beings mattered more than the course of the stars to God who made them all. All new knowledge of the world was and had to be new knowledge of God.

SOCIAL AND OTHER FUNCTIONS.

The annual dinner of the Association was held in the Free Trade Hall on July 25th, Prof. A. H. Burgess presiding. Covers were laid for 600 guests, and more would have attended had it been possible. After the loyal toast (" The Duke of Lancaster"), Dr. W. J. Mayo proposed " The Cities of Manchester and Salford," recalling the fact that his father was a student in Manchester under John Dalton, and that the *Guardian* was quoted all over the United States as a sound, logical, honest, and fearless paper. Alderman Davy and Councillor Collins, in reply, both claimed Dalton, and made play of the administrative problems of two communities situated at each others' doors. Dr. A. T. Bazin, President of the Canadian Medical Association, invited the company to toast the sister Association, and Dr. H. B. Brackenbury, in responding, took the chance of setting out what the B.M.A. was and what it was not. The toast of " Our Guests " was proposed with infinite humour by Sir StClair Thomson, and responded to in the same vein by Judge T. B. Leigh. Lord Moynihan, proposing " The President," spoke of him as an " artist " in his craft. Prof. Burgess thanked all who had contributed to a successful meeting (not excepting the " Clerk of the Weather "), and especially the local general secretaries, Dr. E. Bosdin Leech and Dr. R. G. McGowan.

Honorary degrees were conferred upon a number of distinguished visitors at a congregation of Manchester University, held in the Whitworth Hall on July 24th, the Earl of Crawford and Balcarres presiding. The degree of Doctor of Laws was conferred on Dr. C. H. Mayo, Dr. W. J. Mayo, and Lord Dawson of Penn ; that of Doctor of Science on Dr. C. O. Hawthorne and Sir Ewen Maclean. In replying for the recipients,

including those whom he described as the "Heavenly Twins in Surgery." Lord Dawson said that the Public Orator, Prof. S. Alexander, had referred to Rochester as the Mecca to which all were drawn. To Britons, it was, he thought, more than that; it had played no mean part in strengthening the sense of unity between the free peoples on the two sides of the Atlantic. Among the problems to be faced by medical faculties was, he said, one of real importance at the present time; that was to try to bring about closer contact between the universities and the health services, not least to secure for the officers and workers in those services academic guidance and recognition.

On July 25th the Bishop of Manchester dedicated in the Eccles Parish Church a stained glass window, given by the Mayo brothers in memory of their father, William Worrall Mayo, who was born at Eccles in May, 1819, and died at Rochester, Minn., in March, 1911. In the inscription he was described as a pioneer, physician, citizen, a man of hope, vision, and achievement.

THE ANNUAL EXHIBITION.

An exhibition of surgical instruments and appliances, drugs, foods, books and the like, held in the City Exhibition Hall, Deansgate, from July 22nd–26th, was well arranged and attended. Some account of it will appear later.

COMBINED SECTIONS OF SURGERY, PHYSIOLOGY, AND BIOCHEMISTRY.

ABDOMINAL PAIN.

Opening Addresses.

Prof. E. D. TELFORD (Manchester) being in the chair, Dr. C. H. MAYO (Rochester, U.S.A.) opened the discussion by remarking that to-day the prize-fighter was not alone in his appreciation of the importance of the solar plexus. Abdominal pain, it was now generally agreed, was not merely a question of referred pain or of viscero-sensory reflexes. The structures in the abdomen were themselves sensitive to such stimuli as pulling—to undue contraction or distension. Even the solid organs, such as the liver and ovary, had proved themselves sensitive in operations performed under local anæsthesia, and it was well known that the puncture of an artery could be exquisitely painful. The parietal peritoneum was, of course, very susceptible to stimuli because of its rich innervation from the intercostal nerves, but the visceral peritoneum was also sensitive because of the white medullated fibres described by Langley in the splanchnic nerves. Dr. Mayo dealt at some length with the types of pain met with in gastric crises, their varying incidence, location, and duration, agreeing with Ryle that a more careful analysis of pain was necessary. He admired the contributions of the physiologists, and found Adrian's "Basis of Sensation" wholly delightful and extremely illuminating. Nevertheless, he concluded, "I think I have said enough to convince you that when the character and site of an abdominal pain tells something to the surgeon it does so not because he knows much about the underlying anatomy and physiology, but because he has encountered that particular pain many times before, and he remembers what he found when he opened the abdomen."

Sir FARQUHAR BUZZARD (Oxford) spoke on a more general and philosophic plane. He reminded his hearers that pain was, to the moralist, a corrective, to the physiologist, a protective mechanism, to the clinician, it played its part in healing, but we were not primarily concerned here with the question of the usefulness or uselessness of human suffering. As regards the abdomen, he regarded the territory of the sympathetic nervous system as presenting problems fundamentally different from the ordinary reflex phenomena of skeletal muscle. It was Ross of Manchester who clearly separated somatic from visceral sensation. However great were our difficulties, we should not hide our ignorance behind a diagnosis such as psychalgia or functional pain, and he hoped for the abandonment of such loose terms as rheumatic, neuritic and neuralgic. Sir Farquhar also dealt with the problems of gastric crises, and thought we might come to a diagnosis in such cases "without the necessity of worrying the patellar tendons." He quoted Hilton, "Every pain has its distinct and pregnant significance, if we will but carefully search for it."

Discussion.

Mr. JOHN MORLEY (Manchester) dealt with the views of Sir James Mackenzie on referred pain. He described some of the experiments he had made with Dr. Twining in which it was clear that the position of deep and sharply localised tenderness varied quite materially with posture, and again how referred pain could be proved to be referred, not from the viscus, but from the parietal peritoneum—e.g., from the diaphragmatic surface along the phrenics and to the shoulder. Dealing with the work of Weiss and Davis, in which the effect of local anæsthesia on the areas of referred pain had been investigated, he had repeated their experiments and in the main confirmed their findings. Their support of the Mackenzie view which they thence argued was, however, wrong, for in cases in which the abdomen was opened under spinal anæsthesia, a swab inserted under the diaphragm on one side caused referred pain in the corresponding shoulder, which could be abolished with local novocaine. If the swab were now transferred to the other side of the diaphragm there was extreme pain in the other shoulder, proving, since the spinal paths were blocked, that the impulses were spreading from the diaphragmatic peritoneum via the phrenic nerves. He regarded the application of analogies from the cardiovascular and genito-urinary systems to the intraperitoneal organs as most unfortunate, and maintained that Mackenzie's viscero-sensory and viscero-motor reflexes were twin phantoms, whose abolition would make diagnosis simpler and more accurate.

Dr. E. P. POULTON (London) thought that a reasonable physiological interpretation could be formulated to cover the facts of abdominal pain as at present known. He showed how, in a hollow organ, we should regard tonus rings simply as points where the tension is lower than elsewhere. Describing his experiments on the œsophagus, in which various arrangements of bags can be swallowed and held at different levels and the pressures within them recorded, he pointed out that pain was associated not with contraction but with relaxation. When and where the peristalsis was held up there was extreme pain, and the most severe type of colic was associated with such a hold-up of the peristaltic waves. He indicated how useful information about pain in the chest might be got by noting its relation to swallowing. If felt *after* swallowing the source of the pain was œsophageal. Other types of pain might be stopped entirely by swallowing, or made infinitely worse as in certain dyspepsias.

Dr. A. F. HURST (New Lodge Clinic) thought it unwise to underestimate the importance of reflexes, and said that is was evident from what we knew of the gall-bladder and appendix that visceral pain was mainly due to distension. Localisation in space of the members of the body was mainly due to the impulses arising in muscles, bones, and joints, but there was no similar rigid fixation amongst the viscera. Where an organ was fixed, the localisation of pain was very accurate and informative, but not so in movable organs. In his experience the localisation of pain did not vary with the changes in position of the organ. Pain from the appendix was usually sharply and constantly localised. From the terminal ileum it was referred to the umbilicus, but from the pelvic colon it was merely felt vaguely above the umbilicus in the mid-line. Directly the distension passed from the pelvic colon to the rectum, the pain moved to the perineum, as in the normal call to defæcation. He was not convinced that referred pain in the Mackenzie sense did not exist, and thought that the better study of abdominal pain should do much to improve diagnosis.

Resumed Discussion.

After a brief interval the discussion was resumed under the chairmanship of Prof. H. S. RAPER (Manchester).

Dr. J. A. RYLE (London) said that he had not a great deal of confidence in the evidence got with balloons and the other devices of the experimental physiologist. The piecing together of the wealth of information afforded by clinical observations was more important, but this very wealth was bewildering, and it was seldom that Nature produced a clean experiment. Taking as a type of abdominal pain that associated with spastic constipation, he showed how it might be systematically investigated by ten questions dealing with its character and degree, its spatial relationships, its temporal relationships—duration, frequency, and special times of incidence—and the factors, if any, which were to be regarded as aggravating or relieving its severity. His thesis, from his observations on colonic pain, was that the pain of disease affecting a hollow viscus was in that viscus and was a function of its musculature, that visceral pain may be localised with considerable accuracy, but that when inflammation or severe mechanical stress were lacking referred somatic signs and symptoms were generally absent. He considered that the pain of organic visceral disease was itself evidence of a functional disturbance, and might be closely simulated by the pain of a functional disturbance, without organic disease. He did not suggest that an abnormal degree of tonic shortening or hardening was the sole or even the usual cause of pain in the hollow organs of the abdomen, for there were stresses, not considered here, whereby tension in plain muscle-fibres might be exaggerated with resultant pain.

Mr. V. ZACHARY COPE (London) said that he had cast aside his five pages of typescript, as their matter had already been covered. He had three points he would like to emphasise: (1) Pain from some areas was very accurately referred. Thus the pain referred from the diaphragm should not be loosely described as "shoulder" pain—it was subclavicular, acromial, or supra-spinous according as the focus was anterior, medial, or posterior on the diaphragm, with symptoms due to the stomach, the spleen or liver, or the duodenum or enlarged glands. (2) Localisation by means of the parietes might be impossible. Thus he had himself experienced acute hypogastric (testicular) pain from an appendicular abscess, and had met the same reference of the pain in others. Hunger-pains, associated with the pylorus, might be due to a focus, God knows where! (3) He would remind us how much parietal sensibility varies in different areas. Thus pelvic peritonitis was much less painful and slower in developing pain than the upper abdominal type—the two areas might be regarded as "silent" and "demonstrative" respectively. He agreed with Mr. Morley that the viscero-motor reflex was a myth, the symptom being due to direct irritation of the parietal peritoneum. He had a feeling built on clinical observations that the viscera had a very much larger representation in the *left* side of the brain than in the right—he even estimated the proportion as ten to one! He felt that in the discussion the speakers had not sufficiently differentiated spontaneous pain from that elicited by pressure. In appendicitis, for example, the former was a general hypersensitiveness in the right iliac fossa, whilst the latter could be sharply localised but varied with posture and the like.

Prof. A. W. SHEEN (Cardiff) thought that pain was the last guide for a surgeon to use, and regarded tenderness as a much greater help. He felt very enthusiastic about sympathectomy, as introduced by Leriche for inoperable tumours. In answer to the really important question: Is a surgeon to operate for abdominal pain? he had followed up a large number of non-operated and non-diagnosed cases, and all but one—an obscure case of gastric crisis—were well and working. He referred to severe abdominal pain in erythema multiforme, and said that one of his most popular lectures dealt with 30 causes of abdominal pain in which the surgeon should by no means interfere. It would be a good thing if one could have in hospitals a border-line ward, in which surgeon and physician could go round together.

Dr. A. P. CAWADIAS (London) said that in a consideration of abdominal pain there were three elements to remember—the visceral, the nervous transmission, and the cortical perception, and that often the neurological and psychological points of view were as important or more important than the purely gastro-enterological. Too little stress was laid on the neuritis of the splanchnic nerve, which might be due to an acute infection such as dysentery or to a toxic factor such as alcohol or nicotine. The central perception element could be treated by local novocaine, or by counter-irritation of any kind to inhibit the pain, or by shock therapy. He would plead for a broader conception of abdominal pain, neurological and psychological as well as surgical.

Mr. A. R. FLINT (Leeds) briefly described a case in which, after total gastrectomy, there were incessant hunger-pains. (Dr. POULTON explained that there were contractions and relaxations in the jejunum as in the stomach and œsophagus.)

Replies.

In his reply, Dr. MAYO said that he had been struck by the wonderfully gentle way in which the speakers had treated each other, even where they had serious points of disagreement. It was the general view to-day that surgery was too much the surgery of sacrifice—sacrifices which would have been saved had patients, appreciating the significance of pain, gone earlier to their physicians. Medical discussions were still too much concerned with gross disease—too often treatment was expectant until there was something to sacrifice. Clearly food was implicated as a factor in the ætiology of most of these cases, and in the Mayo Clinic much attention was now being devoted to the allergies and food peculiarities. Referring to the Leriche operation, even this might only be successful for some months, and cases should be treated before such grave indications arose. "I *do dislike* the acute abdomen—laparotomy after laparotomy" were his closing words.

Sir FARQUHAR BUZZARD thought that in the case referred to by Mr. Flint he might be dealing with a form of "phantom stomach." He had been particularly pleased with Dr. Ryle's contribution to the discussion, but was shocked by Prof. Sheen. For himself he believed that we could learn far more by listening longer to our patients, and he would emphasise the danger of stressing the indications afforded by tenderness, since this was a symptom vitiated by fear.

SECTION OF RADIOLOGY AND RADIO-THERAPEUTICS.

EARLY DIAGNOSIS OF CANCER OF THE STOMACH.

Prof. Haudek's Address.

Dr. W. J. S. BYTHELL (Manchester) being in the chair,

Prof. MARTIN HAUDEK (Wilhelminenspital, Vienna) opened a discussion on the value of X rays in the diagnosis of early gastric carcinoma. During the last decades there had been in Germany, said Dr. Haudek, an increase in the average duration of life from 38 to 57 years. From middle life onwards, cancer, next to cardio-vascular diseases, was the commonest fatal disease. In 35 to 40 per cent. of deaths from cancer the stomach was the site of the growth, and early recognition of gastric carcinoma was a most promising line of attack upon cancer. Now that X rays had been available in the diagnosis of cancer for 20 years, to omit their use in diseases attended by gastric symptoms was a professional error. Many thousands of cases of gastric carcinoma had been diagnosed by the aid of X rays, and the number of laparotomies at which incurable cancer was found had decreased (73·8 per cent. during 1901–14; 62·1 per cent. during 1915–25, Eiselsberg, Vienna). Unnecessary and merely exploratory laparotomies had also decreased in number, especially the latter. To the use of X rays also

belonged some of the credit for the increase in the number of resections for carcinoma—from 22–40 per cent. between 1908 and 1924. But 60 per cent. of operations were still undertaken too late. Any estimate of the possibility of further progress—concerning which he was himself hopeful—must involve a consideration of present causes of failure.

There were, he said, three main causes of delayed radiological diagnosis of gastric carcinoma. (1) *The latent period*, during which the disease presented no symptoms. (2) *Delayed X ray examination*, due to latency and to non-recognition of the gravity of the local symptoms by doctor and patient alike. (3) *Faulty X ray examination.* At one time the difficulties of radiology were underestimated. Too much importance was still attached to apparatus, and too little to the operator by laymen, and unfortunately, by many doctors. X ray examination was sometimes undertaken by men with only a little technical training. The result of an examination depended far more on the skill of the investigator than on the quality of the apparatus. The X ray specialist should have a thorough basic knowledge of pathological anatomy and internal medicine. Similarly, physicians and surgeons who carried out their own X ray examinations must be familiar with general radiology, and if not certain of their findings must consult a radiologist of experience. X ray consultations were far too seldom requested. Screen examination without radiography was another fault in technique, especially in the diagnosis of carcinoma, where a study of the "relief pattern" of the mucosa (as seen in good X ray films) was essential. For each examination about half an hour was required, and no more than six to eight consecutive examinations should be undertaken. The investigation may require to be completed the following day. Superficiality and fatigue were inevitable if even an experienced radiologist was required to undertake 20 or 30 examinations in a few hours, as in some hospitals. The results might be only 10 per cent. worse, but what patient would like to be among the 10 per cent. in whom a cancer of the stomach was recognised too late?

Technique.—There was, said Dr. Haudek, no standard technique in gastric investigation. He commenced himself by taking an accurate history of the illness, as a frame into which the X ray findings fit. Before the abdomen was examined the chest was screened, The cause of symptoms hitherto attributed to the stomach might be thus shown to be aneurysm, pulmonary tuberculosis, malignant pleurisy, pulmonary metastases, or bronchial carcinoma. With the patient standing on a low footstool, the abdomen was palpated for increased tension of the recti, localised tenderness, or resistance. Four hours earlier the patient has taken for the motility test a meal of thick gruel containing 70 g. of barium sulphate. Apart from the large residues significant of pyloric stenosis, a small remnant might be visible as a "surface film" of an ulcerated carcinoma. The second meal consisted of about 300 c.cm. of a mixture just fluid enough to swallow, containing 120 g. of barium. The patient first drank one large mouthful, 20–30 c.cm., which was followed down the œsophagus. If there was any delay or dysphagia he gave a small gelatin capsule, containing one gramme of barium. If this, followed by a drink of water, passed undelayed through the cardia, malignant stenosis could be excluded, but the arrest of the capsule was of great service in the diagnosis of cancer of the cardia, whether originating there or in the stomach. When it reached the stomach the first mouthful of 30 c.cm. of suspension was dispersed by compression with Holzknecht's "distinctor" or a pad. The folds of mucosa were thrown into relief by a thin film of barium, and thus the whole stomach wall could be examined, unless retained secretion interfered (by dilution of the paste) with this study of the "relief pattern." Central shadow defects, or furrows between the lobes of a medullary carcinoma, led to a definite diagnosis of tumour. The borders of benign growths were circular and well defined. The stomach was then filled with the remainder of the suspension, and screened at different angles, the contour, the flexibility of the walls, and the peristaltic movements being studied. If in atonic, dilated stomachs the crescentic barium shadow did not reach the lesser curvature in spite of pressure, the patient was laid upon a couch on his right side for a few minutes and re-examined. He attached great importance to examination in the prone position for the study of peristalsis along the lesser curvature. A flat infiltrating growth on the lesser curvature might cause no disturbance of peristalsis along the greater curvature which alone could be studied in the erect position. In his opinion the examination of peristalsis on the lesser curvature (with the patient prone) rendered superfluous the expensive apparatus required for Fränkel's cinematography.

In the majority of cases Dr. Haudek found a single X ray examination to be sufficient, but if the motility test had shown retention of food or secretion, a second examination was required on the following day. Having taken only liquid food on the evening of the first examination the patient returned next day in a fasting condition, and before examination lay upon his right side for at least two hours, with the pelvis raised. The pylorus thus became the lowest point, and the stagnant contents were evacuated more completely than with a stomach-tube. About 50 c.cm. of very thick barium cream were then introduced into the empty stomach, and the examination of the relief pattern made as described; finally the gastric contour was examined with the full drink. If the method described failed, there was either pyloric stenosis, due to cancer or ulcer (which could be ascertained), or there was high-grade hypersecretion due to ulcer. To distribute the contrast substance Holzknecht's distinctor, or one or both hands were employed. The speaker did not use lead rubber gloves, relying on the thickness of the patient's body as a protective medium.

The number of very small growths discovered in the earliest stage was small. A much larger number of operable tumours had been sent to operation, but most numerous had been those in which inoperability has had to be reported. He showed on the screen a dish-shaped tumour which, with the stomach completely filled, might easily be confused with an ulcer niche. In the relief pattern, however, the folds of mucosa terminated abruptly before they reached the carcinomatous crater, whereas they converged upon an ulcer niche. Another slide showed an operable growth at the pylorus. The radiologist's interpretation and the histological report were in agreement that the lesion was a carcinoma, though at the macroscopic examination it had been assumed that an ulcer was present. Circumscribed scirrhus almost always originated on the lesser curvature just proximal to the pylorus, and the greater curvature was drawn towards the lesser as a "spigot" formation. In prepyloric ulcer and benign thickenings the lesser curvature was flattened, and the convexity of the greater curvature is maintained. Medullary carcinoma, even when near the cardia, was the most favourable type of tumour, both in case of diagnosis and operability. Characteristically it showed a central filling defect like a benign tumour, but the latter might sometimes be differentiated by its well-shaped edge, or pedunculation. The radiologist should never assume the responsibility of delaying operation because he considered a tumour as probably non-malignant. Another slide showed a commencing adenocarcinoma high up in the body of the stomach, clearly visible in the partly filled stomach, but impossible to demonstrate with the stomach completely filled. In no single clinically suspicious case in which he had excluded carcinoma during the post-war period had the disease, said Dr. HAUDEK, been later shown to exist. Erroneous diagnosis of cancer was most frequent in the pars pylorica, and the differentiation of ulcer and cancer was most difficult there because ulcers of the pars rarely show niches, and were often accompanied by considerable submucous œdema, which caused irregularity, and by spasm. Thirty

per cent. of prepyloric ulcers underwent malignant degeneration compared with 3 per cent. in the pars media. He referred to investigations upon the significance of gastritis in early diagnosis of cancer (Orator). If it became possible anatomically to distinguish precancerous gastritis from that associated with ulcer, resection of precancerous gastritis would represent the early operation for carcinoma (Konjetzny).

Discussion.

Dr. A. E. BARCLAY (Cambridge) acknowledged the deep indebtedness of radiologists to Prof. Haudek, whose pioneer work had guided him from the outset of his radiological career. He recalled some early failures and early successes in gastric diagnosis, and emphasised that then, as now, he had learned to take nothing for granted—not even the correctness of an adverse operation report. Definite lesions shown in the radiogram can be overlooked at operation. He agreed with the opener in stressing the importance of critical study of the mucosal folds, and of the value of the sign of disappearance of the folds in carcinoma in contrast to their convergence in ulcer. He had not used the opaque capsule for diagnosing growth at the cardia, but used a bismuth bolus. He asked Dr. Haudek whether he could give an explanation of the rapid emptying often noted in early carcinoma wherever situated in the stomach. He felt strongly that re-examination by the radiologist in suspicious cases should be conceded far more willingly by both patient and doctor than was the case at present. A single examination, however painstaking, might sometimes leave a doubt, which re-examination would definitely confirm or dispel. He deprecated overloading the radiologist, especially in hospitals and clinics. Early diagnosis depended first, foremost, and all the time on the knowledge and skill of the investigator.

Dr. J. C. BULL (London) commented on the highly significant fact that in the post-war period the Opener had not had a single negative carcinoma diagnosis disproved by operation. He then showed slides illustrating spasmodic contractures simulating earliest carcinomata; in these cases operation or subsequent course had established their innocent nature. He had found belladonna, so strongly advocated by Carman, disappointing in abolishing these spasms. The speaker emphasised, from his own experience as a clinician practising radiology, that no single method was so valuable as the radiological in diagnosing gastric cancer.

Dr. GILBERT SCOTT (London) said he regarded Prof. Haudek as the patron saint of the direct method in opaque meal work; his technique should be standard for all routine work, not only for carcinoma. Dr. Scott himself had always advocated systematic radioscopic palpation with the small "white-wash" meal. Immediate complete filling was a common source of error. The rugae must be examined in detail. With regard to the surface film often retained on the carcinomatous surface, research should be directed to finding the most suitable consistency of meal to cause such a deposit; watery solutions often failed to give it. He deprecated taking a preliminary history, which was bound to bias the report. He examined first and took the history afterwards. He referred to the difficulty in distinguishing large chronic ulcers from carcinomatous ulcers; it was not his habit to make a diagnosis of carcinoma, but to report an organic lesion. Pyloric carcinoma with dilatation of the stomach showing paradoxical feature of ready passage of pylorus by contents indicated old chronic pyloric ulceration on which malignant disease had been subsequently grafted. The ulceration resulted in obstruction with dilatation, but when carcinoma converted the pylorus into a rigid tube obstruction was relieved. He thought the chief reason for delayed diagnosis was the latent period. He discarded indirect evidence, such as local tenderness, rigidity, and rate of emptying, if this were the sole evidence obtainable, and relied entirely on direct evidence. He hoped Prof. Haudek's paper would not lead the inexperienced worker to subject patients to unnecessary laparotomy on the strength of minute, imperfectly understood, variations of the normal contours. He asked what value he attached, in differentiating simple from malignant lesions, to the occurrence of persistalis right up to the edge of the visible lesion. As regards operability, it was Dr. Scott's habit to confine himself to a statement of the extent of the lesion, leaving the question of operability to the surgeon; the operative findings were supplied him in every case.

Dr. W. H. ROWDEN (Leeds) said he found half an hour too little for an examination. He used a technique similar to Prof. Haudek's, and also insisted on the prone examination. He had found it a help to bring the tube close up under the patient in watching peristalsis in this position, since this exaggerated the size of the peristaltic wave. In taking serial pyloric radiographs the interval should be a minute or longer. Normal radiograms at such intervals never gave two exactly similar pictures, but serials at shorter intervals might do so even in a normal case. Like the opener, he had found an increase in the number of actual resections, indicating an improvement in early diagnosis. As regards pyloric obstruction, one point was of value in differentiating simple from malignant obstruction; obvious pyloric obstruction at the cancer age with a small stomach was invariably due to malignant involvement, with a large stomach it was almost invariably non-malignant.

The PRESIDENT had felt for some time that a definite diagnosis of malignant disease of the stomach ought to be obtained more frequently than in any other condition examined by an opaque meal. With careful examination and improved technique it should soon be possible to put the early diagnosis of gastric carcinoma on a very sure basis. He referred to the difficulties due to extrinsic tumours, particularly of the head of the pancreas, and instanced two such cases simulating gastric carcinoma.

Reply.

In reply, Dr. HAUDEK said the double meal method which he had introduced 20 years ago, with a six-hour normal emptying limit, had been an improvement on previous methods, but he had now come to rely upon direct signs. Alterations of emptying rate were of secondary importance, often purely functional. Rapid emptying, for example, could occur in many conditions, and could not be relied on for establishing early diagnosis of carcinoma. The rapid emptying seen in carcinoma, to which Dr. Barclay had alluded, he ascribed to rigidity of an infiltrated pyloric end, in which, though the lumen was reduced in calibre, there was a failure of the pylorus to close. Six-hour residues were commoner in ulcer than in cancer, and usually larger. He warned against over-estimating the importance of rapid emptying and delay. Dilated stomach was common in ulcer, rare in cancer. Hyperperistalsis, a common functional disorder, was of little value in diagnosis, but anti-peristalsis usually signified an organic lesion. Most important was the interpretation of normal peristalsis. For this the prone position was essential, and he thought it a fallacy in Fränkel's cinematographic method that the standing position was used by that worker. This position failed to show the highly important lessercurvature peristalsis. He agreed with Dr. Bythell that extrinsic tumours might cause difficulties, but the examination of the mucosal relief and the pliability of the gastric walls generally excluded such conditions. Dr. Rowden was in error in thinking 20 minutes to half an hour was all he required for a gastric examination. This was an average figure; many carcinomas were diagnosed in the first few seconds. In a difficult case unlimited time was allowed. As regards a case history, he often had to do without it owing to language difficulties in a mixed population; its importance lay in suggesting some further examination when the stomach was negative. The X ray examination only made an anatomical diagnosis. For the full diagnosis the history was

necessary, and Dr. Haudek said his colleagues often welcomed his general opinion of the case based on examination of many thousand cases.

SECTION OF OCCUPATIONAL DISEASES.

Occupational Dust.

Dr. W. F. Dearden being in the chair, the discussion was opened by Dr. J. C. Bridge, H.M. Senior Medical Inspector of Factories, who remarked that it was in Manchester he joined the Factory Department as a medical inspector, one of his earliest duties being to inquire into an outbreak of "weavers' cough" at a spinning mill. The works of Arlidge and Oliver, he said, were full of valuable mortality statistics for various industries, and Collis, in his Milroy lectures for 1915, dealt fully with the effect of dusty occupations and mortality-rates, emphasising the effects in particular of the dusts of free silica (SiO_2). The inquiry of Dr. Dearden, Milroy lecturer in 1927, into the health of workers in humid cotton sheds and the printing industry, had been carried further by Dr. Bradford Hill.

For himself, said Dr. Bridge, he could do little but indicate some of the more common forms of injury to health produced by occupational dust. He proposed to divide such effects into two arbitrary groups, realising fully that some might fall into both groups, and that others, in the light of better knowledge, should be included in both. These were: Dusts which exercised (*a*) a general toxic effect; (*b*) a localised effect, whether (1) internal, or (2) external.

Group A. Dusts: General Toxic Effect.

This group consisted mainly of the dust of certain metals, and chiefly their salts, which produced a definite syndrome of symptoms. Of these probably the most important, and one which was still met with most frequently, was lead and its compounds. *Lead* poisoning still figured prominently in the notifications made to the Chief Inspector of Factories. (Dr. Bridge gave comprehensive tables of case-incidence and mortality for various industries.) To one point in connexion with lead excretion he drew special attention. Kehoe and other American observers found that lead was excreted in measurable quantities in the urine of normal healthy persons who had not been exposed to any known risk of lead absorption. These findings were confirmed by Prof. Chaston Chapman, and were important because the presence of small quantities of lead in the urine had been regarded as confirming the diagnosis of lead poisoning in a lead worker.

Arsenic.—The classical symptoms due to the inhalation of dust containing arsenical compounds did not often occur in industry. In general, the effect of arsenical dust was manifested by localised affections of the skin.

Manganese.—In 1922 Dr. J. R. Charles, of Bristol, drew the attention of the Department to two cases of manganese poisoning affecting men employed in grinding manganese ore. Other cases had been reported in America in the manufacture of manganese steel. (Dr. Bridge gave the symptoms of manganese poisoning in detail, and dealt with poisoning by zinc, cadmium, and the nitro and amido derivatives of benzene.)

Organic Dusts.—Dusts might act as carriers of toxic substances or organisms, and produce symptoms of a general character. Fur dust after carotting—that is, painting with nitrate of mercury—had produced mercurial poisoning. Wool sorters' disease was due to the inhalation of dust carrying spores of the anthrax bacillus. Of special interest to Lancashire was the condition known as "weavers' cough," which might be due to the inhalation of the spores of a mildew. Closely allied was the cough affecting men working in malthouses. No doubt there were other dust-borne diseases due to the presence of a fungus.

Group B. Dusts: Localised Effects.

The most important and widespread forms of localised internal disease produced by dusts were the various forms of pneumonoconiosis, of which silicosis was the most important. The recent scheme for compensation under the Various Industries (Silicosis) Scheme gave some indication of the widespread nature of the industries in which dust containing free silica occurred. Dr. Bridge mentioned the fine type of fibrous pneumonoconiosis produced by silicates and other minerals, and the effects of the inhalation of coal dust upon trimmers. In time, he said, with a more complete survey of workers exposed to particular dusts, it might become possible to determine the particular form of dust by the character of the fibrosis to which it gave rise.

Vegetable Dusts.—Of the effects of these on the lungs little or nothing was known, but Dr. Middleton concluded that the dust in the case of wheat, barley, rye, and oats contained hairs derived from the grain which on a priori grounds appeared to be capable of causing irritation of, and inflammatory changes in, the respiratory passages. Dr. Bridge quoted the case of a woman employed for 25 years at a bench where she had been exposed to inhalation of pure tobacco dust, and who suffered from loss of sight. He also drew attention to Dr. J. B. Duguid's article (The Lancet, 1927, ii., 111) on the incidence of intrathoracic tumours in Manchester.

Turning to the localised external diseases produced by occupational dust, there were, said Dr. Bridge, few if any dusts occurring in industry that would not produce in certain individuals an inflammatory condition of the skin. This not only made it difficult to decide whether or not a dermatitis was of occupational origin, but threw doubt, in many cases, on the actual causal agent. From his own experience the dusts which appear to exert the most rapid and severe conditions were the nitro compounds of benzene and its homologues—for example, dinitrochlorbenzene, picric acid, paranitraniline. Of simple compounds the sodium and potassium salts of chromium and the caustic alkalis produced not only skin lesions, but ulceration of the mucous membrane and septum of the nose leading to complete perforation. The absence of untoward symptoms following such definite destruction of the internal nares was a matter of surprise. Cancer of the skin was produced wherever pitch dust was generated, and the connexion between cancer and arsenical dust was well established. The oldest form of cancer of the skin—namely, that of the chimney sweep—still occurred. Dr. Bridge concluded by saying, "While once the masters of cure, we are now, or ought to be, the slaves of prevention. A dust-free industry may be ideal, but it should be our goal."

Asbestos Dust.

Dr. W. E. Cooke (Wigan) read a paper on asbestos dust, and the curious bodies found in pulmonary asbestosis. Asbestos, he said, was woven into cloth before the time of Herodotus 450 B.C., but pulmonary asbestosis dated only from A.D. 1900. After describing the chemistry and microscopical appearances of asbestos fibre and dust, and the presence of large particles of the dust in fibrotic and necrotic areas of the lung, he detailed further experimental work on the curious bodies found in this disease. His explanation of their formation was that fine spicules of asbestos, by mechanical action on the bronchioles and alveoli, caused either minute extravasations of whole blood or serous exudates which enveloped them. Interaction took place between the plasma proteins and the soluble fraction of asbestos with adsorption of colloidal aggregates on to the spicules. In support of this he showed specimens containing a slender filament of biotite upon which colloidal matter had been deposited. As these bodies had been found in every autopsy in this disease, and as the only mineral that could possibly produce them was

asbestos, their presence in any numbers was pathognomonic of pulmonary asbestosis.

Dr. A. C. HADDOW (Leeds) described the clinical aspects of asbestosis, and quoted a case in which the curious bodies were found in a man who was not employed in the industry, but who lived next door to an asbestos factory. This result was confirmed by Prof. J. M. Stewart (Leeds).—Dr. W. BURTON WOOD (London) showed X ray photographs of cases of pulmonary asbestosis and compared the picture with that of silicosis.—Sir THOMAS OLIVER (Newcastle) also spoke on the clinical aspects of the disease.—Sir THOMAS LEGGE (formerly H.M. Medical Inspector of Factories) said there could be no doubt of the seriousness of asbestos poisoning among the workers in that material. The idea that nothing but free silica dust would set up fibrous changes in the lungs had had a very bad effect, and the foregoing papers showed how important it was not to underrate other kinds of dust such as asbestos. He hoped to see asbestosis added to the list of diseases for which compensation could be obtained.

Reviews and Notices of Books.

CARDIOLOGY.

The Heart in Modern Practice. Second edition. By WILLIAM DUNCAN REID, A.B., M.D., Assistant Professor of Cardiology, Boston University. London: J. B. Lippincott Company. 1929. Pp. 466. 25*s.*

THE second edition of this text-book differs from its predecessor principally in the addition of nine new chapters dealing with the cardiac arrhythmias. This is hardly an improvement, for, as the author admits, it completely alters the balance of the book, which was its chief merit. One of the greatest difficulties of a student is to get a good sense of proportion and to see the various facts of medicine in their true perspective. For many years heart murmurs were the centre of attraction, more recently they have been superseded by the arrhythmias; but now that these are beginning to fade into the background and find their true level, it is no longer desirable to give them such a prominent place. Among the many minor alterations are the sections dealing with circus movement and coronary infarction, which constitute valuable additions. The electrocardiograms used as illustrations are clear and well reproduced, though we prefer actual polygraphic and sphygmographic tracings to diagrammatic ones. The numerous references to recent original papers will be appreciated by those who wish to study each subject more deeply; but compared with the more modest first edition this volume is on the whole disappointing.

The Pressure Pulses in the Cardiovascular System. By CARL WIGGERS, M.D., Professor of Physiology, Western Reserve University, Cleveland, Ohio. London: Longmans, Green and Co. 1928. Pp. 200. 14*s.*

IN cardiovascular mechanics the history of the development of the instrumental method of investigation provides frequent examples of erroneous conclusions resulting from the failure of workers to recognise mechanical artefacts. As one instrument supersedes another, new features make their appearance in the records. Often these have been attributed to the fundamental processes under investigation, when in reality they have been produced by the physical properties of the apparatus. In recent years it has been the aim of experimentalists to devise instruments in which inertia is reduced to a minimum. Dr. C. Wiggers, being a pupil of Otto Frank, has naturally devoted his attention especially to optical methods of registration, and has collected in this monograph his own observations on this subject and those of other workers. The two opening chapters are devoted to a critical review of the instrumental artefacts which vitiate or modify the form of the records obtained. There follows a series of chapters dealing with the pressure changes and sequence of events within the heart, arteries, and veins, and a consideration of the various factors such as heart-rate, venous filling, and aortic resistance which may modify the normal sequence of events. The author points out that ventricular as well as auricular systole is a fractionate process, and considers the bearing of this fact on the interpretation of the intraventricular pressure curves. In the final chapter he deals with the way in which the commoner types of arrhythmia may modify the mechanics of ventricular systole. To the clinician who lacks a thorough grounding in physics it may prove stiff reading, but it should be read not only by the physiologist, but by all those who are especially interested in the study of heart disease, since so many of the problems considered have a direct bearing on the practice of medicine.

This book forms one of the Monographs on Physiology, formerly edited by the late Prof. Ernest Starling, which are intended to review the present position of our knowledge in those departments which have advanced most in recent years.

Heart Disease in Childhood. By H. B. RUSSELL, M.D., M.R.C.P., and C. K. T. HAMILTON, B.M., M.R.C.P. London: Constable and Co., Ltd. 1929. Pp. 104. 7*s.* 6*d.*

Heart Disease in Childhood is such an attractive title that it is a pity the authors have not kept more closely to their subject. Such descriptions as that of the electrocardiographic method, for example, cannot, by any stretch of the imagination, be legitimately included; the book suggests an elementary treatise on general cardiology which has been modified in order to render it applicable to the cardiac affections of childhood. Rheumatic heart disease is discussed in considerable detail, but the subject of congenital lesions is dismissed in eight pages. It is surprising that the old hypothesis of "back pressure" should still find a place in one of a series of Modern Medical Monographs. On the whole it is our impression that the authors have inserted quite a lot of irrelevant matter, while they have failed to make the most of their material.

What you should know about Heart Disease. By HAROLD E. B. PARDEE, M.D., Assistant Professor of Clinical Medicine, Cornell University. Philadelphia: Lea and Febiger. 1928. Pp. 120. $1.50.

HEART disease to the lay mind is apt to be associated with the idea of sudden death and it is often difficult for people to realise that in its milder forms it is not necessarily progressive, and may, in fact, be compatible with a fairly active life. The object of Dr. Pardee's little book is to elaborate this thesis in language intelligible to the general public, to explain the nature of heart disease and the reasons for the various therapeutic measures employed. By so doing the author hopes to achieve a more intelligent coöperation between patient and doctor and so to enable them to work together to the best advantage. There is an admirable chapter on exercise and rest and the question of diet is fully discussed. Dr. Pardee gives perhaps too optimistic an impression of prognosis, but that is excusable, for he is deliberately out to counteract undue pessimism. His book will undoubtedly be of real value to many sufferers from heart disease, for while avoiding technical terms he has succeeded in giving an accurate, up-to-date and well-balanced account of its more important aspects.

QU'EST CE QUE LA MÉDICINE ?

By E. RIST. Paris: Masson et Cie. 1929. Pp. 235. Fr. 25.

THIS is a thoroughly interesting book of essays, displaying a wide range of general and special knowledge, while its pages are full of the love of history and the appreciation of art. The essay on the Hippocratic oath is one of the best sermons on the sanctity of medical confidence we have read, and the accompanying essay on the moral responsibilities of the doctor is a direct development of the old Greek's words. The essay on the diagnosis of the diseases of the chest before the methods of percussion and auscultation were applied—the dates of these two classic methods of exploration being 1761 (Auenbrugger) and 1819 (Laënnec)—is a sound study, while Les Débuts de la Percussion is a development of this essay and leads up to a general chapter on the progress of our science. Here is a serious lecturer at his best—wise, but not didactic, not flippant, but never dull.

MADNESS IN SHAKESPERIAN TRAGEDY.

By H. SOMERVILLE. With a preface by WYNDHAM LEWIS. London: The Richards Press, Ltd. 1929. Pp. 207. 6*s*.

Mr. Somerville, in a series of interesting essays presenting modern as well as accepted views, deals with the old subject of madness as represented in Shakesperian tragedy, stating his conclusions well and justifying them, where he can, by references to the text. The characters selected for comment are, save perhaps one, familiar to the whole world—their words and their deeds may be said to form a part of universal education. Such characters are Hamlet and Ophelia, Macbeth and Lady Macbeth, Lear and Goneril, Othello, Brutus and Constance, the last being the only one of whom many things cannot be immediately recalled save after a recent reading of "King John." She is best remembered by the terrific words in which she courts death, words which, as Mr. Somerville points out, could not have been used by a person so mentally destroyed. But even though there may be a difficulty in reconciling the coherency of language with the disorganisation of mind, the picture of a battered mentality is vividly presented; and here the author points out that quite early in his creative activity Shakespeare realised the value of insanity as a means for the exhibition of the excessive emotion necessary to the violence of his tragedy. He might have added that in Elizabethan days the insane lived largely with the sane, and were, therefore, more easy subjects for study than they became when segregation was the rule. Constance is selected for particular comment because the rising tide of insanity can be watched throughout a story, at the commencement of which she is perfectly sane; thus we have a fine exhibition of the early growth and development of acute mania. To Hamlet's madness he thinks the type manic depressive most nearly corresponds; Macbeth he labels a paranoiac; Lear, a victim of attacks of acute mania, who, if he had lived, would have been a hopeless dement; Ophelia has the temporary mental overthrow of the girl madly in love; Timon is a sound typification of megalomania; while Brutus's mental breakdown is found convincingly to have many features common with that of Macbeth. Goneril is described as a mental monstrosity, the words implying that anyone so foully wicked could be nothing but mad, while Lady Macbeth more or less escapes analysis—her response to horrible circumstances is a lapse into mad criminality.

The various views in the essays may be exactly regarded, in the author's words, as "attempts to explain some of the difficulties occurring in the speeches, as well as those arising out of the strange and puzzling behaviour of the principal characters during their attacks of insanity." The explanations are for the most part satisfying; they could not be expected to cover the field.

THE MODERN DANCE OF DEATH.

The Linacre Lecture for 1929. By PEYTON ROUS. London: Cambridge University Press. 1929. Pp. 51. 2*s*. 6*d*.

A MODEST little book which is worth careful study and a good deal of reflection. It should be widely read by the hygienist on the one hand and the experimental pathologist on the other. We flatter ourselves that medical science has enormously reduced the incidence and fatality of most diseases and we are apt to forget that the body is just where it was; it has now just the same potentialities and limitations as it had, when infectious diseases left a much smaller porportion of the population to realise that there was a natural end. We dance with death now as we did, but less reluctantly—for it is towards the end of the evening and we are getting tired. Such in brief is the tenour of Dr. Rous's sermon. As he gave it, it is a brilliant commentary on life and individuality, full of shrewd discourse about the hard facts of experimental medicine to which he has himself made such notable contributions. Those who do not care for the philosophy will find the pathology of the best.

STONES, HILLTOPS, AND THE SEA.

By RUTH ALEXANDER. London: Alston Rivers. 1929. Pp. 272. 12*s*. 6*d*.

THIS is a record of a month's travel enjoyed by the author in company with some twenty other people. The party toured the Eastern half of Yugoslavia in two motor char-à-bancs, and met with many small adventures and many large opportunities of learning what life is like in a very unfamiliar part of Europe, opportunities which have been well used in this book. The journey covered Slavonia, Croatia, Bosnia, and Herzegovina, still replete with the signs of Turkish rule, Montenegro, and Dalmatia, with its Italian enclave, and Miss Alexander has noted with discriminating enthusiasm and humour the extremes of fertility and barrenness manifested by the landscapes and the variety of religious tongues, and clothes offered by the populated centres. This is a gay account of a jaunt which, it can be gathered, was thoroughly successful in the event though often trying in its experiences. Some of the many picturesque scenes are reproduced from photographs supplied by two of the author's fellow-voyagers, Dr. G. A. Grierson and Dr. V. G. Ward.

AN OUTLINE OF ENDOCRINOLOGY.

Second edition. By W. M. CROFTON, B.A., M.D., Lecturer of Special Pathology, University College, Dublin; Pathologist, Dr. Steevens' Hospital, Dublin. Edinburgh: E. and S. Livingstone. 1929. Pp. 163. 8*s*. 6*d*.

THIS is the second edition of Dr. Crofton's handbook of endocrinology, originally published in 1924. There are several additions to the text, notably a chapter on the liver chiefly dealing with pernicious anæmia (which, in spite of Minot and Murphy's valuable work on liver treatment, should surely not call for comment in a handbook devoted to endocrinology), and a chapter on recent advances. Many of the views expressed in this chapter are drawn from the author's own experiences, which appear to be so divergent from current medical opinion that they cannot be accepted without reserve. Nevertheless, there is much which is of interest in this book, though flights of fancy such as the following (p. 149) are scarcely to be commended to a serious student of medicine: "There is apparently no gland yet developed that will enable man to grow wings. Must we wait for the millennium until such a gland of internal secretion develops?" Perusal of this book leaves the impression that this happy state can hardly be long delayed. In the meanwhile the medical student interested in endocrinology would be well advised to follow the teaching of more generally accepted text-books of medicine.

THE LANCET.

LONDON: SATURDAY, AUGUST 3, 1929.

MILDER VACCINATION.

WHETHER post-vaccinal encephalitis is directly due to vaccination or whether it can be ascribed to a concomitant infection must be considered unsettled, though it might be argued that the evidence in favour of vaccinal encephalitis is at least as strong as that which is regarded as establishing the ætiology of some other diseases. The fact remains, however, that the number of cases of encephalitis following vaccination appears to be increasing, and recent inquests on such cases have caused a good deal of concern among the public. The increase is perhaps only apparent. It may be that in the past mild cases were not recognised for what they were, and that the association of fatal cases with vaccination was disregarded; but this does not alter the situation for the layman who sees in vaccination sinister possibilities which he had never before contemplated, and who is troubled by a suspicion that the knowledge of these dangers has been withheld from him. The suspicion is void of foundation, for it is only within the last six or seven years that the nervous complications of vaccinia have been recognised in medical circles; within that time, moreover, the Ministry of Health has appointed two distinct committees to consider various aspects of vaccination, and their reports were published together a year ago. The final recommendation of the Rolleston report (which we endorsed warmly at the time [1]) was that steps should be taken to impress upon the public mind the nature and purpose of vaccination, for which the report affords a body of accurate and unbiased information. Unfortunately this recommendation of the Committee has been ignored. No real attempt has been made to instruct the public on the nature of vaccination; to explain its advantages; to acknowledge its complications; and to discuss whether, on the whole, it is to be recommended.

The layman of to-day is too much interested in medical matters and too much alive to their importance to be impressed by mere dogmatic statements. Simply to assert that universal vaccination is necessary in the interests of the public health, and that the direst results are likely to follow its discontinuance, is not to convince him. He requires a reasoned argument and will not be satisfied with anything less. The situation is not rendered any easier by the fact that alastrim has been evident in this country for the last decade and has by its mildness done much to rob the name of small-pox of its terrors. It is true that from time to time there are outbreaks of virulent small-pox with a high proportion of fatal cases, but energetic action by the health authorities has hitherto kept them in control and they have scarcely served to remind the public what a dreadful scourge the disease was in this country not so many years ago. On the other hand, some hundreds of cases of alastrim are notified as small-pox every year, most of which are no more severe than simple chicken-pox. It is perfectly reasonable that the layman should say: why, if this is all that small-pox means, should I worry about vaccination, which apparently is itself more dangerous than the disease from which it is supposed to protect me? It is no good answering that this mild type of small-pox may at any moment change to the virulent form, for this is probably not true; American observations seem to show that for 20 years alastrim has bred true and has remained relatively innocuous. The right reply is that for all practical purposes alastrim differs so much from classical small-pox as to be a distinct disease, and that its mildness does not justify us in neglecting to take proper precautions against the more malignant form of small-pox.

We are left then with the question what precautions the profession should advocate in the circumstances of to-day. There can be no doubt that in an epidemic of severe small-pox the public would accept vaccination without much opposition, but as we pointed out two and half a years ago [2] there is enough sense in the average man's objections—when supplemented by the nonsense of the antivaccinists—"to make universal and full vaccination of infants (as theoretically enforced by Parliament) impracticable in this country at the present time." The first alternative to universal protection, we said, was to let small-pox take its course, offering vaccination to those who preferred it. The second was to modify our methods of vaccination so that sensible people would have no reason to fear and dislike them. The third was to abandon universal vaccination altogether in favour of the effective treatment of contacts in face of an epidemic. Criticism might be lessened, we pointed out, "if such vaccination aimed at conferring only brief and temporary immunity, and it is theoretically possible to check the progress of an epidemic by using an antigen producing symptoms so far negligible that popular prejudice would soon fade away." In the same article we quoted a method suggested by Dr. PARLANE KINLOCH for milder vaccination in infancy, and a few months later we published an account of American views and practice [3] which included a description of means whereby the least possible "take" may be secured. Meanwhile the Rolleston Committee has made its definite recommendation that a trial should be made of vaccination (or revaccination) in one insertion with a minimum of trauma.

In the B.M.A. discussion reported on p. 223 considerable dissatisfaction was expressed with the quality of the lymph available for the use of private practitioners, and from more than one quarter the demand was expressed for the universal supply of Government lymph. It was claimed that the lymph of private firms was unequal in its action, at some times failing to produce reactions, and this is probably true. But the statement in one of the proposed resolutions that in some vaccinations the health of the patient is seriously affected is surely far more significant than the complaint that certain lymphs are ineffective. As the Vaccination Committee pointed out, unsuccessful vaccination is very often due to faulty technique; but an excessive reaction suggests that the virus is too potent or the dose administered too great. It is probable enough that the method of four insertions officially advocated in this country gives the most efficient protection against

[1] THE LANCET, 1928, ii., 234.

[2] Ibid., 1927, i., 238.

[3] Ibid., 1927, i., 671.

small-pox, but we have ample evidence that its use is occasionally associated with severe local and general reactions, and we have the definite opinion of the Rolleston Committee that a different procedure should be tried. American and Canadian results suggest that vaccination and revaccination in one insertion is efficient, and though the actual duration of the immunity conferred is, of course, still uncertain, the Committee had excellent grounds for believing that satisfactory results would be obtained by primary vaccination in infancy, with revaccination on entering and leaving school. The infantile vaccination is undoubtedly of paramount importance. When carried out by the modified method its immediate effects are negligible, whereas all the evidence goes to show that if vaccination is postponed till the school age or later its dangers are definitely increased. The local reaction is greater and it is noteworthy that an overwhelming proportion of recorded cases of post-vaccinal encephalitis have occurred after infancy.

Another important recommendation of the Rolleston Committee was that experiments should be made to determine if it is feasible to reduce the potency of the lymph without impairing its efficacy. We now realise that vaccinia is not only a local disease; the virus is disseminated throughout the body, and the question of the dose inserted obviously requires close study. It is probable that the lymph now in use is considerably stronger than necessary, and possibly the occasional serious sequelæ of vaccination would disappear altogether were a weaker lymph employed. Repeated but less energetic application of a more dilute lymph is likely to be the method of vaccination in the future. It offers adequate protection while at the same time it minimises risk. Vaccination can never be popularised while accidents are common enough to cause complaint in medical circles. Without doubt the public should be widely instructed in the necessity for adopting universal prophylaxis against small-pox, but at the same time we must ensure that vaccination itself is robbed of its terrors.

THE REPORTS OF MEDICAL REFEREES.

IT has been often remarked that a disproportionate amount of workmen's compensation law is made or declared in cases which originate in Scotland. An instance is furnished by the recent decision in the House of Lords in the case of Burrows *v.* Wilsons and Clyde Coal Company, in relation to the reports of medical referees. The judgment of the Lords firmly upholds the finality status of these reports, and at the same time the decision contains useful hints for doctors who may be called upon to act as referees.

In the case referred to the moving parties were the employers, and their object was to have the compensation ended by a declaration that the man had made a complete recovery. Their efforts were made on three separate occasions with substantial intervals of time, suggesting that the referee was proceeding in a strictly judicial spirit and was exercising a severely impartial judgment, as indeed might fairly have been assumed. At the first and the second attempts the employers failed, but after the third examination the medical referee reported that in his opinion the workman had completely recovered from the accident, and that his condition was such that he was fit for his ordinary work. Now the Act says that the report shall be conclusive—things must have an ending, and a county court judge is not qualified, nor probably has he the time, to sit in order to review the technical opinion of a medical expert, and to uphold or reject it on the balance, in his mind, of medical evidence from both sides. And anyhow such procedure might seem to justify appeals to higher courts on purely medical issues, which in most cases would be regrettable. But what happened was that the workman tabled in the county court at Hamilton a specific allegation of later symptoms, said not to be observable on such an examination as had been made by the medical referee, and which, it was alleged, pointed to a distinct risk of the disease recurring from the effects of the same accident. The workman did not, indeed, ask the county court judge to hear evidence on the subject, but he did present alternative suggestions. These were that either the report should be sent back to the referee for reconsideration, or that the order to be made should be one only suspending payment of compensation. The employers, on the other hand, stood upon the finality quality of the existing report, and claimed an order ending compensation. The county court judge took the employers' view and ended compensation. Then the workman appealed to the High Court in Scotland, and that court practically took the workman's view. The President of the court regretted that the man had not moved the county court judge himself to inquire into the allegations of risk of recurrence, and the court decided to send the case back to the county court judge for that purpose. No such step has ever before been taken, and in view of its general importance the employers took the case to the House of Lords. The result has been to restore the county court decision and to declare compensation ended. Lord DUNEDIN censured the step proposed to be taken by the High Court in Scotland as a grave disturbance of the administration code of workmen's compensation. Of that code two essential features are that a medical referee is final on medical facts, and the county court judge, as arbitrator, is final on all other facts.

No doubt it is a matter of temperament whether a medical man will or will not welcome the view that from his report as medical referee there can be no appeal, and that no cavilling at or contradiction of the report is even to be listened to. This latest decision in the Lords makes clear that, when the Act says that the report is conclusive, it means exactly what it says. This decision, then, conveys a lesson not to be forgotten. The quality of finality attaches only to an unambiguous report. This matter has been previously dealt with in these columns at length (vide THE LANCET, 1929, i., 402), the occasion being the observation of Lord SANDS in a judgment delivered in the Scottish Court of Appeal in a case similar somewhat to that under discussion. The report of the referee is no place for recording the considerations, reservations, and pros or cons on which the medical opinion has been arrived at. The problem may be difficult but an unambiguous solution must be put forward. A new feature was introduced by Lord DUNEDIN'S speech. Before this case we should have said that the report must be unqualified, and as a general matter we say that still. But it is clearly contemplated that it is permissible for, and may be the duty of, a medical referee to report a complete recovery combined with—or ought we to say qualified by?—a risk of recurrence of the disease or of the effects of the injury. Is this another case where lawyers and doctors see things differently? A medical man would probably say that either there is complete recovery or there is not, and that if the industrial disease or the accident has left effects or seeds which may produce a recurrence

of the condition, then there is not complete recovery. What appears to be really in view is whether the workman is again fit for the full exercise of his former trade functions. There will probably be agreement that that stage might be reached, and yet a medical man might see the prospect of a recurrence of the injured condition. Lord DUNEDIN clearly holds that a report of complete recovery with that qualification is a competent form of report, and that the consequence (with which, however, the medical man has no concern) is that compensation will be suspended and not ended. In this way this latest case may open a new chapter of difficulties. Obviously, a mere surmise or general suspicion that the existing state of matters may issue in recurrence will not be a proper exercise of responsibility. The attitude must be much more definite than that. Yet the medical referee is neither bound nor entitled to seek relief by stating detailed medical data, thus in effect throwing on the county court judge the responsibility of decision. Further, there might be a class of case in which, while the man is able to work as hard as ever, the fact of his doing so will bring into operation or accentuate the factors tending to recurrence. In such a case could it be reported that there was complete recovery at all ? This class we have imagined, but it assuredly exists and introduces issues of real importance. If complete recovery be reported, with a rider added upon risk of recurrence, the best that the man can hope for is that compensation will be suspended ; that is to say, he will in the meantime, and until recurrence, receive no more compensation. Whereas, if the true view is that in such a case it is not proper to report any form of complete recovery, then the man will continue to draw compensation, full or partial, as the case may be.

THE CORRELATION OF CANCER STATISTICS.

THE radiological treatment of cancer has been accorded greater publicity than any other modern therapeutic method. The community has been invited to subscribe—and has subscribed—immense sums for the purchase of radium and for research into the application of radiological methods to cancer. The lay press has assured its readers that this line of work offers the most promising hope of a successful attack on the most dreaded disease. Experts have adduced satisfactory results in different clinics all over the world, and have shown that these results n certain regions of the body compare favourably with those obtained by surgeons. An effort is now being made on international lines to exploit this new weapon to the full and to prevent its abuse. The Cancer Commission of the League of Nations, realising the world-wide significance of the development in radiotherapy, appointed a subcommission to gather and collate information on methods and results. Unfortunately for this purpose the practice of radium therapy—the quantity of radium salt used, the shape of the applicators, the method of application, and the period during which the exposure is allowed—varies in different clinics, quite independently of the adjustment necessary to adapt general rules to a particular lesion in a particular patient.

The region of the human body first selected for investigation was naturally the genital tract of women, since the results after a period of years from all clinics are impressive. The subcommission entrusted to an executive committee, consisting of Dr. J. HEYMAN of Stockholm, Dr. A. LACASSAGNE of Paris, and Prof. F. VOLTZ of Munich, the task of collecting detailed case records from the three large clinics with which they are respectively connected, in the hope that these might be correlated. The report of the subcommission, which has just been published, forms a document[1] of great interest. Its most outstanding feature is, paradoxically, its failure to achieve its object. The subcommission had intended, from a study of results combined from these three centres, to draw up statistical data which would form a guide to radio-therapeutic treatment. Dr. JANET LANE-CLAYPON spent much time and labour on an attempt to produce this analysis, but was forced to the conclusion that the methods employed in the three clinics and the classifications of stage of disease differed in such essential particulars, and that the data of after-history were set out so inconsistently that any attempt to correlate the three sets of figures could only cause misunderstanding. It is not yet possible, in fact, for an unbiased statistician, from the material provided, to express in figures an opinion on the exact value of radium in treatment, or on the best technique for applying it. But it is clear that if radiological methods are to be explored and improved the experience of the big clinics must be available for smaller and younger foundations, and the subcommission have, therefore, taken steps to clarify the position. They have drawn up, with great care, a set of rules for the classification of the different varieties of utero-vaginal cancer, for the grouping of growths into different stages, and for the essential statistical data and the method of calculating results, and have elaborated a scheme for describing the details of technique. They have also designed a standard international case-record with a diagram for marking extent of growth, which has already been adopted by the three clinics at Stockholm, Paris, and Munich, and which will, it is hoped, be adopted by all other institutions using radiological methods. Five years hence, therefore, there should be a body of strictly comparable statistics from all parts of the world. From these it should be possible to decide with reasonable accuracy which methods are giving the most satisfactory results.

Though the achievement of the main object of the subcommission has had to be postponed, the illustrated accounts supplied by the three members of the executive committee, which form the bulk of the report, will certainly encourage those who look to radium and X ray treatment as the hope of the future in gynæcology. The results obtained show a steady improvement year by year. It is, however, obvious that the details of dosage and method of application must be most carefully considered and adjusted if the end-results are to be satisfactory. The increasing use of radium by practitioners who are not fully instructed in its technique offers a serious threat of abuse. The inexperienced doctor may rest content with transitory improvement in cases which he ought to cure, or may apply an inadequate or excessive dose by a method which has been discarded as unsatisfactory. No one who is unable to spare time to attend such practical courses as those offered by St. Bartholomew's or the Westminster Hospitals, or to work for a period at radium clinics, should attempt to treat patients himself. The fact that an international effort to frame, if not a code of rules, at least an indication of preferences, has failed, is not a warrant for daring experimentation by individuals even more ignorant of the physical and physiological forces thus harnessed than are the experts. The danger of the widespread advertisement of radium in the treatment of cancer is undoubtedly its casual adoption in private practice by men who would not try to perform an intricate surgical operation. With the establishment in all countries of convenient treatment centres in connexion with hospitals this danger should cease. It is probable that the study of records compiled on a comparable basis will lead to a standardised technique, but it is unlikely that this will ever be adapted for the use of those without special training.

[1] League of Nations Publications. III: Health. 1929. III., 5. Publications Department, League of Nations, Geneva. (London: Constable and Co.).

Annotations.

"Ne quid nimis."

METROPOLITAN ASYLUMS BOARD.

THE annual report[1] of the Metropolitan Asylums Board, which has just come into our hands, reviews the work of the Board for the year which ended on May 31st last. The Board was established in 1867, to combine the unions and parishes of the metropolis, for the purpose of establishing "asylums" for the reception and relief of the sick, insane and infirm, and the present is the thirty-first report which sets out the discharge of these functions. It will be the last review of a complete twelvemonth report to be issued by the Board, for on April 1st next the whole of its functions will be transferred to the London County Council, and more in sorrow than in anger, the story of this transfer is told (pp. 27–29). The transfer is, of course, only a part of the comprehensive measure for the revision of local government, which received the Royal Assent on March 27th, and it may be surmised that, had "asylums for the sick, insane and infirm" been imbued elsewhere with the spirit and ideals of the Metropolitan Asylums Board, no occasion would have arisen for such drastic change. In a previous report the Board made clear to the Minister of Health the value which it has set upon its work, a value which there will be few to question. Since its inauguration in 1867 the Board has enlisted the services of men and women who have devoted themselves to the work of providing, maintaining, and extending where necessary the public hospitals required by London for infectious diseases and tuberculosis, mental hospitals, ambulance and transport services, a training-ship, and other lesser services. The whole of the debt of nearly £7,000,000, raised to meet capital expenditure on the erection, acquisition, and equipment of these hospitals has been paid off, with the exception of a sum of about £300,000, representing expenditure on grant-aided services of which the Government is responsible for one-half. The Board now has under its control 25,000 hospital beds, and in times of pressure employs a staff of 10,000 persons. Its duties have steadily increased, and only last year Parliament imposed fresh responsibilities in connexion with the Metropolitan Common Poor Fund. It has been especially galling to the group of 73 members—33 elected by metropolitan boards of guardians and 18 nominated by the Ministry of Health—that they are now to be superseded by virtue of a guillotine resolution which provided no opportunity in the House of Commons for the discussion of the provisions of the Bill as they related to London, the whole of these being passed en bloc in a few minutes, so that no reference was possible in the House to the work of the Board. In other years we have taken the opportunity afforded by the annual report to call attention to one or other of the far-reaching avenues of reparative and restorative work for which the Board is responsible. The present report is the largest which has yet been issued, and after the usual summaries — administrative, general, medical— nearly 200 pages are allotted to a series of papers contributed by medical officers of the infectious hospitals, mental hospitals, tuberculosis, sick children, and dental services. To some of these we shall recur. Had the Board always presented its report in a form so attractive and well illustrated as the present, its work would have been even more widely known among the rank and file of the medical profession than it is at present. With one aspect of the work we have kept our readers closely in touch for long past, by recording the weekly bulletin of cases in the infectious hospitals. Many developments may be deduced from a careful study of this list—the increasing hospital care of measles and whooping-cough, th allotment of more than a hundred beds for the stud of the results of encephalitis lethargica, the provisio of beds for mothers to accompany their infants wit ophthalmia neonatorum, the segregation of cases c puerperal fever for concerted study—to name but few of the directions in which the work of the Boar has led the rest of the country in the effective treat ment of infectious disease.

[1] From the Office of the Board, Victoria Embankment, London, E.C. 5s.

REPRESENTATIVE MEETING OF THE B.M.A.

Manchester was much impressed, if a litt mystified, by the proceedings of the Representativ Body of the British Medical Association which co cluded four strenuous days' business there las week. The newspapers were astonished to find tha delegates working daily from 9.30 A.M. till 6.30 P.M could easily be reconciled to the prospect of a furthe evening session, but this, of course, will not surpris those who know their medical profession from th inside. What was far more remarkable was the spir in which the representatives tackled the programm set before them—a programme making continuou demands on altruism as well as understanding, neithe of which was lacking. Dr. E. R. Fothergill had som justification when he described the meeting as epoch making, for it included far-reaching decisions on th working of voluntary hospitals, the future relations c public and private medical service, and the practic of midwifery. In all these matters the profession ha a hard task to keep up with the march of events whic are largely beyond its control, but the schemes pr posed and approved at Manchester are at the ver least a laudable attempt to divert progress into path which lead in an approved direction. Some idea c their nature and their reception may be gained fro the brief report of the meeting which we conclude o another page of this issue.

PELVIC IRRADIATION IN THE PREGNANT WOMAN.

THE use of radium and X rays in gynæcology increasing every year. It is therefore becoming mo and more important to know what effect, if an irradiation exerts upon the ovary and the embryo, a whether it is likely to prejudice the health of subs quent children. The question is difficult to investigat for it is almost impossible to assess the numero other factors capable of causing ill-health or defect the offspring. Very little is known of the effects heredity and environment upon the mother and t unborn child, or the extent to which disease in t mother, either local or general, may influence t fœtus. This is particularly important since the pel is only irradiated for some kind of pathological co dition. All the defects of structure and function th have been observed in the children of irradiated wom have also been observed in the children of others, a no condition has so far been recognised as pathogn monic of irradiation. It is nevertheless possible draw certain general conclusions from a careful stu of a series of cases. Dr. Douglas P. Murphy, of t University of Pennsylvania, has recently published analysis of 320 pregnancies from the literature,[1] and another 283 of which data were supplied by a number radiologists and gynæcologists in answer to a qu tionaire.[2] The 320 cases in the literature included women who had undergone irradiation after conce tion; 44 of them carried their children to ter 27 of the children presented some disturbance health or defect in development during the peri over which they were observed. Out of 198 full-te pregnancies which followed preconception irradiati only 10, or 5 per cent. of the children were r

[1] Surgery, Gynecology, and Obstetrics, 1928, xlvii., 201.
[2] Ibid., June, 1929, p. 766.

perfectly healthy when under observation. Although no account is taken of other detrimental factors, it appears, as would have been anticipated, that irradiation is much more likely to prejudice the health of the child if performed after conception than if performed before. The children of the women who were treated after conception presented, on the whole, the more serious lesions.

The material provided by the questionaire was, of course, much more fully documented. It did not appear that irradiation before pregnancy increased the probability of abortion. The abortion rate was 21 per cent. only, compared with the 33 per cent. suggested by various statistics as the rate for the population at large. In the group irradiated during pregnancy the rate was, however, 43·3 per cent. Of the 53 women who were irradiated when pregnant, 23 aborted while 12 of the remainder bore children who were classified as unhealthy according to the definition laid down for the purposes of the investigation. The children suffered from under-weight at birth, microcephaly, hydrocephaly, blindness, Mongolian idiocy and other gross defects of structure and function, mostly involving the central nervous system. Dr. Murphy considers that most of these disturbances may therefore be fairly attributed to the irradiation. His supposition is supported by animal experiments.[3] He regards the damage as due, perhaps, entirely to the direct irradiation of the embryo, and hardly at all to the effect of the rays upon the internal secretion of the ovaries. The unhealthy children born by the 230 women who had received irradiation before conception only numbered 15 per cent. of the total. Many of their disturbances were not serious, and none of the children showed microcephaly; moreover, all the lesions were of kinds which also appear among the children of mothers who have not been irradiated. The infantile mortality-rate was lower among the children in this group under investigation than among the general population. The conclusions which Dr. Murphy suggests are, first, that no pregnant woman should receive pelvic irradiation if the child is to be allowed to go to term, for according to his figures, there is risk that it will suffer from a serious defect; secondly, that, before a woman is irradiated, it should be definitely ascertained that she is not pregnant.

[3] Reifferscheid. k. Strahlenth., 1925–26, xxi., 266.

SYNTHETIC PERFUMES.

To throw a perfume on the violet, is, we learn on high poetic authority, to be guilty of ridiculous excess; but we have, it seems, approached that absurdity. In *Science Progress* for July, Mr. H. Stanley Redgrove discusses the present state of synthetic perfumery. The general conclusion we may draw from his article is that nature may be imitated very closely but that in most cases delicate noses will prefer her products to those produced in the laboratory, although these have their uses. Pure substances are rarely found in nature. So far as the organisms which yield perfumes are concerned, their main rôle is not to produce pure chemicals, but to carry on their own life and to continue it in their progeny. The odoriferous substances which they secrete are incidental to this and in most cases the odour which has caused them to be esteemed is due not only to a main product but to others associated with it. In the course of investigations on organic chemistry many odoriferous products have been separated, some identical with, others only smelling like the main constituents of natural perfume. The least attractive example of a substitute perfume is the use, now confined (and even then with danger) to cleansing and polishing preparations, of nitrobenzene for bitter almonds, of which the odoriferous principle is benzaldehyde. A more subtle case of partial identity quoted by Mr. Redgrove is that of jasmine. The natural perfume consists mainly of benzyl acetate, an easily synthesised substance, but not a very satisfactory substitute alone, as otto of jasmine contains also benzyl alcohol, linalol, linalyl acetate, methyl anthranilate, indole, and a ketonic body jasmone. Not all of these substances are pleasant smelling alone and in quantity. Many artificial "musks" have been used, since, in 1888, Baur accidentally discovered one. The best seems to be trinitrobutylmetacresol-methylether, and other nitro bodies are used. Musk itself appears to be a methyl cyclopenta-decanone, containing neither nitro group nor indeed nitrogen in any form. Synthetic vanillin appears satisfactorily to replace the product of the bean. Ionone is used now in most preparations of "violets." The main use of synthetic perfumes seems to be when blended with the more complex products of nature. Possibly a more determined effort in the direction of better culture of perfume yielding plants might enable the natural products to hold their own. While the industry is not exactly of fundamental importance to medicine, there are occasions on which the injunction *cura jucunde* requires perfumes.

CLINICAL TRAINING AT THE SYDNEY MEDICAL SCHOOL.

THOUGH there is a close association in this country between the medical schools and the hospitals to which they are attached the hospitals were mostly incorporated long before they were used as training places for students, and moreover in very large centres not one but many hospitals are needed to give the clinical facilities required for the education of one year's batch of university students. The election of university professors who are to undertake hospital duties is usually made by a joint committee consisting of representatives of the hospital and of the university, assisted by experts, but the ordinary staff appointments are generally made independently of the university, which is then invited to recognise the person appointed as an official teacher. This custom has not led to friction, though in the early years of a medical school the attempts to impose academic ideas on an institution already staffed have not always met with success. According to our Australian correspondent the conditions in which the students of the Sydney Medical School receive their clinical training are ideal, for not only is the Royal Prince Alfred Hospital, Sydney, one of the most progressive in Australia, but the Act of incorporation provides that the Senate of the University of Sydney controls the conditions under which the medical students receive their training. The result is that all the professors and lecturers of the University medical school are members of the staff of the hospital and all medical appointments to the hospital are made by a conjoint board consisting of the members of the University Senate, together with the directors of the hospital. Much of the present-day efficiency of the hospital is due to the sound foundations laid early in this century by the late Sir Thomas Anderson Stuart, the professor of physiology, and who was Dean of the Faculty of Medicine at the University for nearly 40 years. The board of directors of the hospital consists of ten representatives of the subscribers and governors of the hospital, ten representatives of the Government, and two ex-officio members of the University Senate, including the Chancellor and Dean of the Faculty of Medicine. There is no specific provision for a representative of the medical profession, other than the Dean of the Faculty of Medicine, but the board has always endeavoured to secure the election or appointment of men who represented the branches of the medical profession necessary to the efficient administration of the hospital. Under the by-laws of the hospital the honorary medical staff form a medical board, to which is referred any subject of medical importance for opinion and report. Arrangements are made periodically for the members of the permanent administrative staff of the hospital to visit Great Britain and the United States of America in order to maintain the hospital in accordance with modern

developments. The specialties appear to be particularly well served. The professor of psychiatry (Dr. R. W. Dawson) and his assistants now carry out their work as part of the daily routine of the hospital. The attendance at the venereal diseases clinic, first established in 1917, has latterly become so great that it has been found necessary to limit the number of patients on any particular day. The department of urology was developed as a result of the generosity of Dr. Gordon Craig, who contributed £20,000 towards the establishment of an urological department at the university, while the committee controlling the £140,000 collected for a cancer research institute in connexion with the University of Sydney and the supply of radium made available by the Commonwealth Government has provided facilities for colloidal lead treatment at the hospital and has also installed a deep X ray therapy plant. Every cancer patient is reviewed by a conference of experts, and a decision is made whether operative surgery, radium, or deep X ray therapy or lead will be utilised. Since the establishment of the clinic there has been a marked influx of patients from New South Wales and the adjoining States. The students should also benefit from the establishment of a social service department, since they are apt to neglect during their hospital years those problems of environment and economic condition, the adjustment of which forms such a large part of their duties in private practice.

MAN AS A CARNIVORE.

IT is widely believed by medical men that the consumption of large quantities of meat causes a strain on the cardiovascular and excretory systems which may be at least partly responsible for the production of arterio-sclerosis and nephritis. Moreover, a section of the profession is at the present time engaged in preaching the doctrine that meat is a dangerous form of food for human consumption on account of the risk of auto-intoxication following the absorption of putrefactive products formed from it in the large intestine. Neither of these beliefs or theories rests on any very solid foundation of established evidence, though it is possible that they are of real practical value to the clinician as a guiding principle. Any direct evidence that promises to shed even a gleam of light on the vexed problem of the harmful or beneficial effects of meat diets on mankind will always be welcome. An experiment has been recently carried out in the United States to test, as thoroughly as modern clinical and laboratory investigations will allow it to be done, the effect on man of an exclusive meat diet lasting for one year. The subjects of the experiment were the arctic explorer Stefansson (who had previously lived in the arctic regions for seven years on a similar diet) and his colleague Andersen. The exhaustive metabolic, bacteriological, and chemical investigations carried out during the year have not yet been reported in full, but a brief summary of some of the main results has been published by Dr. C. W. Lieb,[1] who took part in the work. No decrease in physical or mental vigour was observed either subjectively or objectively in either of the men, although sedentary lives were led by both. They endured the hot weather of a New York summer just as well as in former years, and at the end of the test period had a very good colour. Andersen noted that his hair stopped falling out shortly after the meat diet was started. Stefansson maintained a blood pressure of 105 systolic and 70 diastolic throughout the whole period, in spite of the fact that he had lived on an exclusive meat diet for seven years before the present test was begun. Andersen's blood pressure was 140 systolic and 80 diastolic at the beginning of the test, and 120 systolic and 80 diastolic at the end of the year. The average protein intake was not really excessive, amounting to 100 to 140 grammes a day. The bulk of the diet in each case was composed of fat. Most of the meat eaten consisted of boiled or stewed cold storage meat. Stefansson occasionally took egg when he could not get meat; Andersen took no foo but meat the whole time. In spite of the fact tha this diet contained but very small amounts of calcium no evidence was obtained by radiography that ther had been any absorption of calcium from the lon bones. At no time were there any signs in eithe subject of disturbance of the renal functions, an chemical analyses of the blood revealed no significan alterations apart from a temporary lipæmia after ver large amounts of fat had been eaten. In the case o Andersen, a sugar-tolerance test carried out at th end of the meat-eating period produced a typica diabetic curve. It was noted that the stools of bot subjects remained inoffensive, very few putrefactiv spore-bearing organisms ever being found. Th intestinal flora were in both cases simplified as regard both types and total numbers of bacteria. For th first few days of the test period Stefansson was give nothing but lean meat, and he predicted that he woul soon feel ill. After two days he developed nausea an diarrhœa with lethargy and general weakness. Th addition to his diet of suitable quantities of fat wa followed in two days by complete recovery, and fo the remainder of the year no further trouble of th kind occurred. At the end of his test period Anderse had an attack of lobar pneumonia. He made a uninterrupted recovery, and it was noticed that h showed few of the toxic symptoms of other patient in the hospital with the same type II. pneumonia While the results of these observations are no intended to be regarded as a piece of propaganda i favour of the consumption of large quantities o butcher's meat, they are of very great interest as demonstration of the apparent harmlessness of a mea diet to healthy white men living in a temperat climate.

[1] Jour. Amer. Med. Assoc., July 6th, p. 20.

A CASE OF GENERALISED BLASTOMYCOSIS

GENERALISED blastomycosis is not common, an a case from the clinic of Prof. Kerl, in Vienna, recentl demonstrated by Dr. E. Urbach, presents unusua features. A patient, aged 30 years, who has bee under observation at the clinic for ten months, gav the history that two years ago a swelling appeare on his gums, with ulcers, and that this was followe after six months, by swellings on the thigh, th abdomen, the neck, and face. Surgical treatment wa tried, as well as X rays applied to the gums. Whe the patient was seen first by Dr. Urbach, a thir purulent secretion was oozing from the lanced tumour on the neck, thigh, and abdomen. Syphilis wa excluded, and all examinations of the blood, sputum and cerebro-spinal fluid gave negative results. mycotic disease was suspected, and microscopi examination showed the presence of a yeast in pur culture in all secretions; the yeast was found also i sections of the swellings included in giant cells. Th patient gave a distinct allergic reaction on intra cutaneous injection of blastomycin, and the organism was lethal to experimental animals (mice and rats The patient suffered from chronic bronchitis. Yeas fungi were found in the sputum and cultivated, bot from the urine and from the cerebro-spinal fluid Treatment of the generalised infection with auto genous vaccine, with X rays, with intravenou injections of iodine, in large doses, had some tem porary effect, but the patient soon relapsed. Recentl he has had a high temperature, with rapid extensio of the disease in the mucous membranes. The mening are now affected, and the prognosis is regarded a bad. The newly instituted laboratory for mycot diseases, attached to the Vienna dermatologica clinic, has lately been able to establish the mycot origin of many rare affections of the skin, and certain cases of chronic bronchitis and bronchiectasi It is possible that the yeasts are responsible whe "oidium albicans" is frequent in the mouth, th œsophagus can easily be affected. Hitherto, blast mycosis has not often been reported in Austria, bu now we must be on the lookout for it.

THE CLINICAL SIGNIFICANCE OF LACTIC ACID.

RECENT research into the metabolism of carbohydrates in the human body has led clinicians to study more closely the products of this metabolism in many pathological conditions. The brilliant work of A. V. Hill and others has shown that lactic acid is an important product of normal muscular activity, being formed in the process of contraction without the intervention of oxygen. It is only in the phase of recovery after contraction that a portion of this lactic acid is in fact oxidised, whereby sufficient energy is liberated to enable re-synthesis of approximately four-fifths of that originally formed into some complex precursor body. Prof. J. J. Macleod in his exhaustive account of the physiology of glycogen, lately published in our columns,[1] could not identify such an unknown percursor with either the glycogen of muscle or its free sugar. His experiments showed that it was only when oxygen supplies failed to keep pace with demands that any significant lowering of muscle glycogen occurred, and that lactic acid continued to accumulate in muscle after death, even after all the glycogen present had disappeared. It is therefore probable that some substance is formed between glycogen and lactic acid, though the nature of such an intermediary body is at present unknown. Whatever may be the exact part played by lactic acid in muscular activity, its non-removal places the body in a condition of so-called oxygen-debt, whereby it is ensured that the over-production may be gradually compensated for by an increased oxygen-intake after the acute period of excessive formation has ended. Extreme and violent periods of exercise may thus lead to an enormous accumulation of lactic acid in the muscles and blood; on the other hand even slight exertion may similarly lead to accumulation, if the processes of oxidation and removal are themselves deficient. Increase in lactic acid may thus result from over-production or from non-removal, or from a combination of both.

The normal quantity of lactic acid in the blood is reported by various workers to lie between 9 and 30 mg. per 100 c.cm. of blood, being subject to relatively wide variations and greatly increased by muscular exercise. Its subsequent fall is effected both by the prolonged increased oxygen absorption after the exertion, when the oxygen-debt is made good, and by its excretion unaltered via the kidneys and skin. Analysis of the urine and of the jerseys worn by the players after a violent game of football have shown the relatively enormous quantities of this acid that may be excreted through these channels. In some pathological conditions it is probable that a defect in one or all of these mechanisms is at fault. In hyperthyroidism, for example, a relatively small amount of physical effort is sufficient to lead to an abnormally large oxygen-debt, and Zondek has shown that the oxygen dissociation curve of the blood in this condition resembles that found during muscular work in normal individuals; it is suggested that many cases of Graves's disease are in fact the result of abnormal metabolism in the muscles, to which the thyroid hypersecretion is secondary and compensatory. In cardiac failure the highly acid urine may contain large amounts of lactic acid, and the return to alkalinity under treatment offers a valuable and important guide to prognosis; in this case the defect is both one of impaired oxidation resulting from the limited pulmonary ventilation with partial asphyxia, and one of lessened excretion by the kidneys and skin. A maximum efficiency of lungs and circulation is associated with rapid disappearance of lactic acid from the muscles, and what is known as training is probably at least in part a process of increasing this rate of removal. It is suggested that the stiffness and cramp so frequent in the unfit after bodily activity is a result of such non-removal. Bergmann and Dresel[2] have brought evidence to show that an excess of lactic acid is a cause of the muscular exhaustion occurring in myasthenia gravis, and Arai[3] in a review of intermediary metabolism quotes the increase found after injection of adrenalin or administration of thyroid extracts. Further investigation into the relationship of lactic acid to pathological states of exhaustion will no doubt continue to throw light upon these fascinating and difficult problems.

There are, however, other significant facts in connexion with this subject. Warburg has shown the importance of lactic acid in the growth of malignant tumours, and the presence of this substance in the cancerous stomach is well known. Craven Moore and Roberts[4] have gone so far as to state that its presence in a test-meal is pathognomonic of gastric carcinoma, and according to others a part at least of this acid is produced directly by the tumour; there is, it seems, an increase in blood lactic acid in patients suffering from carcinoma whenever this is associated with metastases in the liver, and it is conceivable that traces may be excreted into the stomach though there may be no growth actually in this organ itself. It is certain that disordered hepatic function may lead to high lactic acid values in the blood, and the change in the blood after a dose of this substance has been used as a test of liver efficiency. In diabetes a marked rise of blood lactic acid occurs after the ingestion of sugar, which can be immediately reduced by the injection of insulin. Tanaka[5] and others have shown a similar occurrence in experimental lack of vitamin B, and also in beri-beri in man. Arai makes the interesting suggestion that the peripheral neuritis occurring in both may be due to an intoxication by some product of pathological metabolism. It is a suggestion that deserves further consideration.

[1] THE LANCET, July 6th, p. 1; July 13th, p. 55; and July 20th, p. 107.

[2] Bergmann, G., and Dresel, K.: Zeit. f. Klin. Med., 1928, cviii., 120.

[3] Arai, M.: Le métabolisme intermédiaire en médecine, Verhandl. d. Jap. Gesellsch. f. inn. Med., 1928, xxv., 21.

[4] Moore, Craven, and Roberts, W. M.: Quart. Jour. Med., 1928, xxii. (Proc. Ass. Phys.).

[5] Tanaka, K.: Centralbl. f. die ges. inn. Med., 1928, liii., 345.

THE STORAGE OF X RAY FILMS.

THE disaster at the Cleveland (Ohio) Clinic continues to have its repercussion in all countries where celluloid film is extensively used in medical practice. Sympathy has gone out to Dr. G. W. Crile for the unkind irony of fate which singled out a man who has done so much to relieve the suffering of humanity and who has contributed so much to the safety and comfort of patients in hospitals. Particularly distressing for him has been the widespread impression that the disaster occurred in a hospital when, as a matter of fact, it happened in a building specially contructed for diagnostic and laboratory work. Such a separated clinic building was a further attempt to protect the hospital patient confined to bed. We learn from the *Bulletin* of the Cleveland Academy of Medicine, which has analysed the pathological findings, that some of the earlier deaths were due to carbon monoxide poisoning, while other more delayed reactions resulted from nitrogen dioxide. The reaction for cyanides was questionable. In a report made by the State Department of Industrial Relations to the Governor of Ohio, the immediate cause of the disaster is described as follows:—

1. X ray films in basement storage room decomposed slowly in their cabinets because of the heat from either a leaky steam pipe in the room, or from electric light bulbs hanging on ordinary cotton insulated wires.

2. Gases generated by the decomposition seeped into the room and thence into a pipe tunnel which circles the basement and thence into pipe chases which led to all parts of the building.

3. The first explosion occurred near a switch-board in the basement when the circulating gases came in contact with cold air entering the basement through an open window.

4. The second explosion probably occurred in the walls

and pipe chases and the third explosion probably occurred between the ceiling of the fourth floor and the roof.

The investigators appointed by the U.S. Army Chemical Warfare Service have now issued their own report on the causes of the disaster. A special chamber was constructed in order that experiments might be made as nearly as possible under the same conditions as obtained in Cleveland, several tons of film being employed. It was found that ignition could be provoked without the presence of a flame by such agents as hot steam piping or an electric light bulb. Mere storage of film in an overheated room gave rise to evolution of toxic gases. While combustion in a free supply of air does not result in any large quantity of poisonous gas, in a limited supply of air, and when combustion is brought on gradually, large quantities of carbon monoxide and nitrous oxide along with higher oxides of nitrogen are produced. Chemical extinguishers were found of no avail, but large quantities of water were effective if applied in good time. The comparative safety of film made with a basis of cellulose acetate was confirmed by the American investigators. Their report concludes with the statement that a storage vault 7 by 8 by 8 ft. with a 16-in. square vent in the rear wall just below the roof, held close by a 155° F. fusible link, affords reasonably safe storage for a ton and a half of film.

Two recent brochures (Nos. 74 and 76) of "Occupation and Health," issued by the International Labour Bureau in Geneva, give in concise form some of the salient facts in the combustibility of cellulose. The decomposition of the nitro-cellulose which it contains continues, once it has been started, even in the absence of air, because its complex molecule contains sufficient oxygen to combine with the hydrogen and carbon present. In the case of detonation innocuous gases, such as nitrogen, steam, and carbon dioxide, are formed. But when the material burns in a confined space the decomposition is less complete, so that nitrous fumes, carbon monoxide, and possibly hydrocyanic acid, are given off. Once alight celluloid burns rapidly, with leaping jets of flame, attaining a temperature of 1500° to 1700° C. Unstable qualities of celluloid may decompose at about 100° C. and may even take fire with an explosion, a phenomenon which for good qualities only occurs at 150° to 170° C.; but decomposition may continue without flame, even after apparent extinction of the fire, with the generation of explosive gases which may reach distant situations and cause a fresh outbreak. Conflagrations of celluloid, or its less active decomposition without flame, cannot be damped down by ordinary methods of excluding air, by immersion in carbon dioxide or in steam, since all the elements needed for combustion are present in the material itself. One gramme of nitrocellulose film is said to set free 260 c.cm. of carbon monoxide, 150 c.cm. of oxides of nitrogen, and 5 c.cm. of hydrocyanic acid, as well as traces of acrolein and camphor. Hence a fire caused by it can only be fought by men wearing gas masks, while those who are rescued must be looked upon as possible cases of gassing, particularly by nitrous fumes, the symptoms of which, although they do not become manifest for some time, may cause death within 24 hours.

As a result of the Cleveland disaster, the Public Health Council of New York State has prohibited, after September 1st, next, the sale or distribution of cellulose-nitrate film for X ray purposes, and it is understood that New York City will take similar action. The State of Ohio has issued an elaborate set of recommendations designed to achieve the same end. Cellulose-acetate films are "strongly recommended" in place of the inflammable variety, and where the latter are in use, or in storage, it is suggested that a print should be taken for record purposes and the film destroyed. In the meantime, our own Protection Committee, as it is called, has suggested certain common-sense precautions, such as the desirability of storing X ray films in special cabinets or cupboards and so limiting the number which are lying open during reference, and especially the need for a film store, isolated and cool, in the case of institutions where large numbers of films accumulate. It was stated at the recent annual meeting of the Institution of Fire Engineers in Manchester, that certain hospitals might have on their hands as much as three or four tons of film without conforming strictly to the requirements of the celluloid regulations. It was stated at this meeting that insurance companies were conferring with hospital authorities in the matter of storage. No doubt practice varies at present, but we have been given details of one large X ray department recently built in which the films, as they are returned from the wards, are filed in steel boxes which are themselves kept in a large fire-proof crypt in the basement. Such a crypt, which is remote from steam pipes and electric wiring, may be as safe as the concrete outbuilding which would be ideal where space made it practicable. We learn from various sources that the non-flam or cellulose-acetate film has not only the drawback of expense—a serious matter when radiographic films are so large—but also that it is apt to have a yellowish tinge and to be less translucent than the nitrated film. The Protection Committee indicates the undesirability of permitting smoking or naked lights in the proximity of a film store, but it is perhaps fair to repeat that X ray film is not ignited by chance contact with a glowing cigarette end. Any general rule against smoking in an X ray department would be disregarded as an indication of childish panic rather than of considered judgment.

AUTOHÆMOTHERAPY IN SYPHILIS.

A REMARKABLE case of resistant syphilis, with an intractable Wassermann reaction, has lately been described by Beume,[1] of Hanover. The patient, who presented himself for the first time in November 1926, with a typical chancre and a negative W.R. had two courses of treatment, each consisting of ten injections of neosalvarsan (0·45 g.), and 15 injections of bismogenol, concurrently. His third course, in May, 1928, was begun too late, and was frequently interrupted, so that his W.R., hitherto negative, became strongly positive at the end of it. His fourth course included a series of mercury inunctions and ten injections of neosalvarsan. The fifth course began in December, 1928, and entirely failed to influence the progress of a tertiary cutaneous manifestation at the scalp margin. Just after the eighth salvarsan (and twelfth bismogenol) injection the patient had a riding accident, and was brought to hospital with a hæmatoma of the knee and ankle-joints. During his four weeks' detention there was mild fever. He said nothing to the hospital authorities about his luetic infection, but on discharge on March 12th of this year presented himself at Beume's clinic, where it was found that the cutaneous lesions had dissappeared and the W.R. had become completely negative. Beume remarks that the pyrexia, as well as the hæmorrhage, may have influenced the sequel, and raises the interesting question whether the protein set free in the serum, or the fact of their having been previously salvarsanised, was the more important factor in bringing about a cure. He maintains that the proposal, which he has previously made, to treat Wassermann-fast cases by a combination of salvarsan, bismuth and autohæmotherapy, receives further support from this case.

[1] Derm. Woch., June 6th, p. 812.

SALARIES OF HEALTH OFFICERS IN U.S.A.—The New York State Department of Health states that with the increased number of full-time health officers, there is awakening a more general disposition to remunerate more fairly all health officers for their services. In a comparison recently made of cities of 100,000 population or over as to the salaries paid health officers in 1923 with the salaries paid in 1927, it was found that the average salary increased from $5000 to $6200; in cities of 50,000 to 100,000 population it increased on an average from $3404 to $4570.

The Clinical Interpretation of Aids to Diagnosis.

A Series of Special Articles contributed by Invitation.

XXXVIII.

INTERPRETATION OF THE SCHICK TEST.

THE Schick test has now become a well-established clinical aid to diagnosis; it is, therefore, important to have a clear idea of what we ask it to tell us under any given circumstances and to what extent we can rely upon the answer.

The test consists in the intradermal inoculation of a minute amount of diphtheria toxin accurately measured; in susceptible persons a characteristic red circular swelling appears. In such persons the injection of antitoxin will produce immediately passive immunity which will last about three weeks, whereas by giving prophylactically toxin rendered non-poisonous by the action of chemical and physical agents—i.e., "toxoid," with or without the addition of antitoxin, in three doses a week or more apart, active immunity of indefinite duration can be produced.

Technique of Test and Reading of Results.

The technique is simple; the prescribed dose of toxin—with English products, 0·2 c.cm., with American and continental mostly 0·1 c.cm.—is injected intradermally. It is advisable to use the special sharp rustless steel needles, much smaller than the ordinary hypodermic size, sold for the purpose; the plunger of the syringe must fit so tightly that liquid cannot readily be forced past it by any finger pressure. If the needle be held nearly parallel to the skin it is easy to inject intradermally and produce the desired small circular swelling. Even if the operator feels that he has gone too deeply, the proper reaction will probably be obtained, but it is easy to repeat the injection an inch away in the forearm. It is wise always to assign the same forearm—preferably the left—as the one for the toxin injection, and the other for the control fluid. Clear descriptions of the various reactions to be looked for are usually supplied with the various products on the market.

The *negative* reaction, when there is no local red reaction on either arm, and the *negative-and-pseudo*, with equal reactions on the two arms usually fading in a few days, indicate that the patient has a high degree of immunity against diphtheria; he is considered as "immune" against the disease.

The *positive* reaction shows a red flush from half an inch to two inches wide. This usually appears within 24 hours, but may be delayed until the second day and in unusual instances to even the third or fourth day. It is wise to make a final reading on the seventh day. The redness gradually disappears, a fine scaling may occur, and the resultant brown stain fades slowly during the next few weeks. (It is well to offer women patients the option of being tested just above the knee, for a circular brown stain on the forearm, which in patients with sensitive skins may last for some weeks, may be resented.) The right arm into which the control fluid is injected may show a red reaction, while the left arm shows a much larger and probably more intense reaction. This *positive-and-pseudo*, and the simple positive reactions indicate that the patients have either minimal or no immunity against the disease; they are "susceptible."

Clinical Use of the Test.

We may use the test (*a*) in considering whether a given patient has diphtheria, (*b*) we may ask is a given subject immune when we are attempting to control an epidemic, or (*c*) when merely seeking the susceptibles in a non-epidemic period in order to immunise them.

(*a*) If we Schick-test patients with sore-throat, we must consider the result first in its relation to treatment, secondly as a help in administration. It is true that practically every patient admitted to an isolation hospital suffering from diphtheria is Schick-positive (unless, of course, antitoxin has already been given). But for the average patient treatment should not await the application of, or result of, the Schick test. All experienced authors agree that the practitioner responsible for treating a patient complaining of a sore-throat, with some membrane present, which he thinks is probably due to diphtheria, must give antitoxin at once without awaiting the results of swab or of Schick test. The records of every large isolation hospital show that deaths and instances of prolonged convalescence with paralysis or cardiac weakness occur due to failure to give antitoxin when the patient is first seen and the suspicion of diphtheria first arises in the practitioner's mind. From the *administrative* point of view, on the other hand, the test may give great help. The injection of the Schick dose of toxin will give a correct reading even if antitoxin be given four or more hours later. In some hospitals all patients with a "mild" attack are Schick-tested and either given antitoxin four or five hours later—or the physician, guided by long experience of diphtheria, may decide that the patient requires no antitoxin. But this is not a decision for which the wise general practitioner, who has not the patient under observation from hour to hour, will ever wish to take responsibility. If a patient suspected to be suffering from diphtheria gives a negative response to the Schick test, it is very unlikely that the disease is diphtheria. To most useful medical rules there are exceptions. Rare instances are recorded in which "mild diphtheria" has been seen in patients known to be negative to the Schick test—e.g., sore-throat with a slight amount of membrane, temperature probably never reaching 100° F. and a very slight disturbance of health, with absence of complications during convalescence.

To sum up, the Schick test used with discretion may aid in treatment, but it cannot always give us decisive information that will relieve us of the duty of giving antitoxin where diphtheria is suspected; it may be of great service in deciding whether the case should be treated from the public health point of view as one of diphtheria.

(*b*) When attempting to control an epidemic in a school or institution, the test will aid us much. The method has been often described. The whole population is Schick-tested and divided into positive and negative groups. In the latter no diphtheria will occur; only amongst the positive reactors will cases appear. The two groups are swabbed in the search for "virulent carriers" amongst the negative reactors, and to detect, in the stage of incubation, any diphtheria amongst the positive reactors. (If the outbreak be a violent one, it can be stopped entirely by giving antitoxin at once to the positive reactors. Some three weeks later active immunisation may be begun.) Where possible, however, it is better to employ active rather than passive immunisation.

(*c*) When we begin to immunise a group of people as a prophylactic measure, the test is the basis of the whole procedure. With the knowledge and experience gained during the past decade by testing on the large scale, we can say whether, as a compromise, it is permissible to immunise without testing. Since most children of early school age are positive to the test, the tendency of public health authorities is to immunise all children up to the age of 6 or even 10, without preliminary Schick-testing. Some public health authorities do not test as a routine after immunisation. This saves time and money, the obvious disadvantage being that cases of diphtheria may occur amongst the inevitable small residuum of children who do not become Schick-negative

after one course of any of the diphtheria prophylactics available, and this may discredit the whole procedure.

Reservations.

Error may conceivably arise from faulty technique, readings, or the conclusions drawn. Reliable "buffered" diluted toxin of sufficient stability is now available and the technique of the test is simple. The reading of the reaction can be made in the great majority of instances readily and with confidence. A pale red coloration 5 mm. in diameter is clearly a negative reaction, a violent red one of 20 to 30 mm. clearly positive. A small number of reactions may make one pause; pale reactions from about 5 to 10 mm. in diameter are difficult to read as either positive or negative; the reading on the seventh day, however, will clear up most difficulties. The wise practitioner will not in such instances waste time. He will leave the conclusion to any expert available or will make whatever decision will be least dangerous to the individual tested. If the symptoms of the patient suggest diphtheria, but the Schick test is returned as "negative," the doctor will be well advised to conclude that a mistake has been made in the test and to be guided by his clinical observation; he will, therefore, give antitoxin. If the reaction be a "doubtful" one, he will conclude that it is really positive and will give antitoxin. In testing with a view to immunisation, or retesting after immunisation, he will give prophylactic treatment to all with "doubtful" reactions.

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The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg.-Lts. (D) to be Surg. Lt.-Comdrs. (D): R. M. Finlayson, C. G. Cruickshank, T. Hunt, L. B. Osborne, R. J. Mc. A. Andrews, A. W. Wallace, L. M. Hughes, and C. J. Finnigan.

ROYAL ARMY MEDICAL CORPS.

The undermentioned Capts. to be Majs.: J. C. Collins (prov.), and remains secd.; W. I. FitzG. Powell, and remains secd. G. W. B. Shaw.

Lt. (on prob.) N. J. Nicholson resigns his commn.

ARMY RESERVE OF OFFICERS.

Lt.-Col. C. A. J. A. Balck Foote having attained the age limit of liability to recall ceases to belong to the Res. of Off.

TERRITORIAL ARMY.

Col. J. S. Riddell (late R.A.M.C., T.F., ret.) to be Hon. Col. R.A.M.C. units, 51st (Highland) Div., T.A.

Lt. J. Cook to be Capt.

Supernumerary for service with O.T.C.: A. J. Parer to be Lt., supern. for serv. with Med. Unit, Univ. of Lond. Contgt., Sen. Div., O.T.C.

INDIAN MEDICAL SERVICE.

Col. J. W. D. Megaw to be Maj.-Gen.

Lt.-Col. H. M. Mackenize to be Col.

Maj. G. R. Lynn to be Lt.-Col.

Capts. G. M. Moffat, L. G. Pearson, and Pirojsha Merwanji Antia to be Majs.

DEATHS IN THE SERVICES.

Surg.-Commander Devonshire Penrose Hawkes Pearson, R.N., who died on July 22nd, entered the Navy as a surgeon in 1913, and was appointed to the cruiser *Antrim*. He served in the Grand Fleet during the early part of the War. In 1916 he was nominated for special duty in the Mediterranean, and in 1918 became P.M.O. of the new cruiser *Danæ*, with the acting rank of surgeon lieut.-commander. He was confirmed in this rank in 1919, and was promoted to surg.-commander in 1925. He retired from the service last year.

Special Articles.

MODERN HOSPITALS IN SWEDEN AND DENMARK.

BY H. S. SOUTTAR, F.R.C.S. ENG.,
SURGEON TO THE LONDON HOSPITAL.

IT is probable that the next few years will see a general reconstruction both of our hospital system and of our hospitals themselves, more especially in the provision of a hospital service for private patients of every class. I therefore welcomed the request of my colleagues on the staff of the London Clinic and Nursing Home, a large private hospital which is at present being erected in London, to visit the clinics of Sweden and Denmark and to gather such information as might be of use to us in equipping this new hospital on the most modern lines. Our party was formed of the managing director, the architect, the domestic bursar, and myself, so that we were in a position to criticise and appreciate all we saw from every point of view.

Nothing could have exceeded the kindness with which we were everywhere received, and every possible facility was placed at our disposal. In the course of ten days we travelled nearly 3000 miles and went over 17 hospitals from the cellars to the attics. We were very greatly impressed by all that we saw and by the immense strides made in medical service throughout Scandinavia. It has become a national service in the best sense of the term, supported by the resources of the State, organised and controlled by a progressive medical profession, and quite obviously used and welcomed by the public, both as a privilege and as a right.

The position of these hospitals must be understood if their significance is to be appreciated. The organisation differs greatly from that familiar to us. Sweden is divided into a number of administrative counties and each of these is responsible for the care of its own sick. In a central town a large hospital which serves the whole county is erected and maintained by the county authorities, who have a considerable measure of autonomy. In only a few large towns, such as Stockholm itself, are these special hospitals maintained by the municipal authorities, and here also are a few independent endowed institutions, such as the Diakoniss Hospital in Stockholm.

Payment According to Accommodation.

In every one of these hospitals, even in those which correspond to our poor-law infirmaries, the patient has to pay according to accommodation. It is true that with the working class these payments are made from insurance societies, membership of which is universal, whilst the charges themselves are exceedingly moderate, varying from 3*s.* to 21*s.* a day with the accommodation. It is, however, a perfectly definite payment for services rendered, and although it is backed by the State, or in a few cases by endowment, there is quite obviously no question of charity in the transaction.

As to the accommodation provided, it is everywhere of a very high order. There is a general tendency towards the abolition of large wards and the limitation of the beds to six or eight at the most. The majority of the beds are in rooms taking one, two or three patients, and as a result the patients have a degree of privacy impossible on the older system. This might at first appear to involve additional work for the nursing staff, but the arrangements are so convenient that this does not result. In every hospital ample provision is made for private patients, but the accommodation differs only in small refinements from that in the rest of the hospital, for, indeed, the latter can hardly be improved upon.

A Medical Director.

In all the public hospitals visited by us the professional work is under the control of a medical director, who mostly has a large degree of executive control, and a number of assistants working entirely under his authority. The system is the usual one maintaining on the Continent and differs fundamentally from that customary in this country. It cannot be denied that it leads to a degree of coördination which must be of advantage both in the progress of medical science and in the treatment of the individual. It necessarily involves, however, the concentration of all the more important work in the hands of a few individuals, and the effect of this is accentuated by the fact that practically the whole surgical work of the country, both public and private, is carried out in the hospitals. It is true that in Stockholm and Gothenburg there are large private hospitals, open to all practitioners, but, in general, surgical practice is only carried on within the walls and by the staff of the local hospital.

Spacious Buildings.

The buildings themselves give an impression of spaciousness and of coherent design which is very impressive. The Academic Hospital, at Upsala, with accommodation for 577 patients, is situated in grounds 25 acres in extent, yet the buildings are so arranged that access from one to another is easy. Even in the great County Hospital of Copenhagen, which is designed for an ultimate capacity of 1000, contact between the various departments and sections of the hospital is easily maintained by large underground tunnels. Spaciousness and accessibility have been combined with extraordinary skill.

The feeling of space is maintained by the large airy corridors upon which all the modern hospitals are based. With the use of separate rooms for the patients the pavilion system, in the ordinary form, ceased to have any advantage, so that some modification of the corridor plan is universal. The corridors have been kept clear of every encumbrance, even the doors lying flush in their walls, and to look down one of these long corridors, silent and empty, to a window in the far distance is impressive. Silence indeed is one of the most remarkable features of these hospitals, for the floors are covered with rubber or cork, the doors are hollow and packed with wool, and there are no bells. Every now and then a light appears in a little bulb over one of the doors, to indicate that a patient requires the nurse, and its silent call adds still further to the impression of quiet.

The Patients' Rooms.

The patients' rooms are of adequate size, much larger than those in many of our nursing homes, and the fittings are simple and well designed. The fact that box-spring mattresses are almost universal shows the standard of comfort supplied. Central heating is everywhere in use, and the double windows, necessitated by a Scandinavian winter, are so arranged as to allow of full ventilation without a draught. The excellence of the ventilation of all the hospitals we visited was a surprise to those of us who are familiar with Continental custom. In the private rooms hot and cold water is always laid on, and in the private Red Cross Hospital in Stockholm each room has its own lavatory attached.

The Baths.

As one would expect in Sweden and Denmark, the bath departments are constructed on a magnificent scale, and one would have to go to Bath or to Buxton to find their rival in this country. Every conceivable form of bath is supplied, and all are in constant use. It appears that rheumatism is a serious problem, and almost every hospital has a separate rheumatic section, specially supported by the State. It takes the form of a boarding-house to which patients can be sent from any part of the county served by the hospital and where they can live comfortably at very low rates, usually met by insurance, during their treatment. The whole organisation seems admirable, and it might well be adopted in this country.

X Ray Equipment: Operating Theatres.

The X ray equipment was everywhere of the highest order and few hospitals in this country could approach what appears to be an almost standard installation. The diagnostic and therapeutic departments are in every hospital entirely distinct, with entirely separate generators and equipment. The diagnostic department is generally equipped with the convenient apparatus designed by Prof. G. Forssell, and the generators have usually a capacity of 120,000 volts. In the newer hospitals Stabilivolt generators by Siemens and Halske are installed, with a capacity of 220,000 volts, for purposes of treatment. The finest of all is the equipment at the County Hospital of Copenhagen, where the new "cannon" apparatus is the last word in radiotherapy; this whole department, controlled by Dr. Leif Arnzten, stands by itself as an example of superb equipment and design.

The operating theatres are everywhere designed on a lavish scale and are arranged in self-contained suites of theatre, anaesthetic room, sterilising room, surgeons' room. One of the finest is at Västeräs, where the central section of the top floor is given up entirely to theatres. A large sterilising room with completely duplicated equipment is placed between two large theatres. Behind these a very large corridor gives direct access to all three and forms an ante-room. From this opens on the other side, dressing rooms, sisters' stores, a special X ray room for pyelograms and other special work, and a writing room for the surgeons. It is true that modern theatres in this country are arranged in a similar way, but rarely with such convenience and never with so much space and light.

Unlimited Space and Light.

One accustomed to working in a hospital in London is perhaps most impressed by the unlimited space and light available. The wide airy corridors, the large balconies on to which beds can so easily be wheeled, the ample space provided for the operating suites, and the obvious consideration for the comfort and convenience of all those who have to work in the hospitals, are evidence of sound organisation and thorough efficiency.

In the hope that it may be of assistance to those who are anxious to see for themselves the hospitals of Sweden and Denmark, a list is appended of those which appeared best adapted to the requirements of this country.

—	Beds.	—
STOCKHOLM.		
Sophiahemmet ..	95	Private hospital with training school for nurses.
Red Cross Hospital	60	Private hospital.
UPSALA.		
University Hospital	577	Director: Prof. Nystrom; Asst. Director: Dr. Westerborn.
VÄSTERÄS.		
Central Lazarett ..	285	Director: Dr. Norrlin; Asst. Director: Dr. Berner.
NORRKÖPING.		
Lazarett ..	350	Director: Dr. Bager.
COPENHAGEN.		
Bispebjerg Municipal Hospital	800*	Surgical Director: Dr. Wessen.
Kobenhavns Amts Sygehus (county hospital)	300†	Medical Director: Dr. Jorgensen; Surgical Director: Dr. Helsted; Secretary: Inspector Knud Warming.

* To be increased to 1800. † To be increased to 1000.

It must not be imagined that these hospitals are a new departure in policy; they are rather part of a steady evolution, the evidence of a very remarkable appreciation in Sweden and Denmark of the value of modern medicine and surgery, and of a determination

to give them every material assistance that is possible. They are State hospitals in the sense that they are built, equipped, and subsidised by the public authorities, but it is very evident that they are no product of a bureaucratic system but of a wholehearted coöperation between the medical profession and the State. In the very best sense of the word they are National hospitals, and we who visited them are convinced that only on the basis of National funds can such services be supplied.

The Defects of the Voluntary System.

Voluntary effort has done magnificent work for the hospitals of this country, but the problem has entirely changed and has passed beyond its powers. On the one hand, owing to the extraordinary advances in medicine and surgery during the last 20 years, it is impossible for private charity to cope with their demands. On the other hand, the sick poor for whom our hospitals were founded have disappeared, and in their place a class is demanding, and in my opinion rightly demanding, admission to our hospitals, who would resent the suggestion that they are the objects of charity. The care of the health of the nation is now recognised to be a function of the State, and it is impossible to dissociate our health from our hospitals. Unless our hospitals are maintained at the highest level of modern efficiency, we are bound as a nation to fall behind.

Far from our hospitals being as they once were the envy of other nations, the great majority are years behind the times, and lack of funds compels the hospitals of our metropolis to carry on their work in the heart of London with an equipment and in surroundings which would not be tolerated in a small provincial town in Sweden. Most of them are in financial difficulties and some are virtually bankrupt, so that it is inconceivable that they should be able to bring themselves up to date, whilst their mere maintenance makes quite unfair demands upon those who have hitherto so generously borne the responsibility upon their shoulders. They have made a gallant fight against social and economic changes which have altered entirely the clientèle which they serve and removed the old sources of their income, whilst they are faced with financial demands such as voluntary effort can never be expected to meet.

The Future.

Is it not time that we recognised these facts and faced boldly a complete reconstruction of our whole hospital system? All of us who have grown up under the old system, where the charity of our nurses, of our doctors, and of the public worked hand in hand to relieve suffering and to help the poor, will view its departure with regret. Yet I feel confident that the future will hold far greater opportunities than the past, and I have returned from my visit to Sweden and Denmark not so much depressed by the backward condition of our hospitals as stimulated by the prospect of the possibilities which lie before us. For I am convinced that we shall set our house in order and regain our lead.

In conclusion, I can only express our gratitude to our friends who placed at our disposal so generously their time and the resources of their hospitals, and most of all to Prof. Viggo Christiansen, of Copenhagen, and Dr. John Hellström, of Stockholm, who organised our visit and to whom we owe its success.

REBUILDING OF MIDDLESEX HOSPITAL.—At a meeting of the Court of Governors last week Prince Arthur of Connaught, the Chairman, gave an account of the progress and finance of the scheme of rebuilding. The work in hand and provided for includes the new west wing, a new nurses' home (an anonymous gift), a new residents' house, a block for paying patients (the gift of Lord Woolavington), an annexe ready to be converted into an out-patient department, and a great central power house, in addition to Mr. S. A. Courtauld's gift of the Institute of Biochemistry. The amount still required to complete the building is £380,000 and there is a gap of about £16,000 a year between receipts and expenditure. A sum of £15,000 is required immediately on current account.

MEDICINE AND THE LAW.

Colonel Kynaston and the General Medical Council.

THE failure of Lieut.-Colonel J. W. Kynaston's action against the General Medical Council blocks one possible avenue by which a medical practitioner, aggrieved at the removal of his name from the Register in consequence of charges of unprofessional conduct, might conceivably succeed in reopening the merits of the disciplinary issue. Nothing is more certain in the legal view of such issues than the fact that, if the General Medical Council has properly conducted its inquiry into the conduct of a practitioner charged under Section 29 of the Medical Act with "infamous conduct in any professional respect," the law courts will flatly refuse to interfere with the Council's finding or to rehear the matter by way of appeal. Colonel Kynaston, therefore, could not possibly succeed in his recent attempt to have the record of his removal deleted unless he could show that the Council had acted without jurisdiction, or with bias, or in some other fashion contrary to natural justice. His attempt was based on three grounds. One of them was a definite allegation of bias. The conduct in respect of which his name was removed from the Register some seven years ago was, he contended, in part a criticism of Sir George Newman's administration as Chief Medical Officer of the Ministry of Health: Sir George Newman was, he complained, a member of the committee which decided the disciplinary issue; *ergo*, the tribunal was biased and prejudiced. When a party enters upon litigation his legal advisers will, of course, expect him to use every possible weapon; Colonel Kynaston, in making what the Lord Chief Justice called a "faint suggestion" of bias in the circumstances stated, may have been relying rather upon a technical than a substantial foundation. The King's Bench Division made short work of his allegation. Lord Hewart remarked caustically that there were only two answers to it: firstly, that there was not a tittle of evidence of bias; and secondly, that Sir George Newman did not take part in the decision.

The other two grounds of Colonel Kynaston's application were less invidious. He maintained that the book and letters in respect of which he was accused of unprofessional conduct amounted to the adoption and advocacy of a theory of medicine and surgery, and was, therefore, privileged under Section 28 of the Act; disciplinary action taken in these circumstances was, he argued, illegal. Further, he claimed that he had applied to have his name removed at his own request before the charges formulated against him were tried; the examination of the charges thereafter was, he contended, improper. On this latter point the judges of the King's Bench Division made it clear that a practitioner, if minded to do acts which would clearly invite disciplinary proceedings, cannot claim to have his name removed from the Register, and afterwards, when those acts have been completed, claim to have his name restored again. Mr. Justice Avory pointed out that the statutory declaration required from a practitioner who seeks to have his name removed from the Register at his own request contains a statement that he is not aware of any proceedings, or of any reason for proceedings, for the removal of his name penally. Mr. Justice Branson remarked that even on such voluntary application the Council is to remove the name "if it thinks fit," so that there still remains a discretionary power in the Council. Looked at generally, as the Lord Chief Justice observed, no small part of Colonel Kynaston's case was an invitation to the King's Bench Division to review the decision reached by the Council seven years ago. "It is well settled," said Lord Hewart, "that the Court has no such power: the Council did the very thing which the law empowers them to do. The matter, he added, which was seven years old had been stirred, not because any human being could seriously consider that there was any ground for

undoing what the Council had done, but because Colonel Kynaston had been summoned for another offence under the Medical Act, and it was desired to add a make-weight to the defence in those proceedings.

The Police-court Proceedings: Colonel Kynaston's Appeal.

In those police-court proceedings[1] to which Lord Hewart was alluding, a fresh step was taken by Col. Kynaston on July 15th, when he made an application at Marlborough-street police-court with a view to appealing against Mr. Cancellor's decision dismissing summonses against him under the Probation of Offenders Act.

It may seem strange that there should be an appeal where there has been no conviction, but the Criminal Justice Act of 1925 (Section 7, as amended in 1926) allows a person in whose case any order under the Probation of Offenders Act has been made by a court of summary jurisdiction to appeal to quarter sessions as if he had been convicted, provided that he did not plead guilty or admit the truth of the information at the original trial. Mr. Cancellor, it will be remembered, dismissed outright the summons charging the defendant with having wilfully and falsely pretended to be a doctor of medicine. The second summons, charging him with wilfully and falsely using the title "M.R.C.S. Eng.," Mr. Cancellor found proved; Col. Kynaston must, he thought, have known that the use of those letters would lead readers to believe that he was still a member of that distinguished body. The magistrate, however, refused to register a conviction on this latter charge because of the following extenuating circumstances: first, Col. Kynaston had no opportunity of arguing his case before the Royal College of Surgeons; secondly, a somewhat similar summons was withdrawn a year or two ago—a fact which might have lulled him into an erroneous sense of security from further proceedings; thirdly, Col. Kynaston had done distinguished work both in his military service and in his civilian practice afterwards. As, however, the magistrate accompanied the dismissal of the summonses with a serious warning of future penalties if the defendant persisted in publishing the advertisement, it is natural that Col. Kynaston should wish to reopen the decision.

"Wilfully and Falsely."

It was made clear in the previous proceedings against Col. Kynaston that there was no suggestion of fraud. In proceedings under Section 40 of the Medical Act of 1858 it is an important element of the charge that the accused should have "wilfully and falsely" pretended to be, or should have "wilfully and falsely" taken or used a medical title or any name, title, addition or description implying that he is registered or recognised by law as a medical practitioner. The principal leading cases on the meaning of "wilfully and falsely" have been those in which American "correspondence" degrees were in question—an abuse which has now largely ceased. In Andrews *v.* Styrap (1872), Thomas Andrews had used the letters "M.D." after no more elaborate qualification than the purchase (without going to America, studying or passing any examinations for such degree) of a diploma as a doctor of medicine from the University of Philadelphia. Baron Martin, when the case came up to the Exchequer Division, remarked, "this is no diploma at all, it is a mere pretence." The magistrates, he said, were right to convict: "there was ample evidence that the appellant *wilfully* (for he did it on purpose) and *falsely* (because he pretended thereby to be on an equal footing with any regularly bred and registered physician or M.D. in England) took, assumed, and used the title of 'M.D.' under a diploma obtained by him from an American University without any course of previous study or any examination, but simply on the payment of a sum of money, and which diploma therefore he must have known to be in fact utterly worthless and valueless as an indication of the possessor's merit, learning, and skill as a physician or as giving him any of the privileges of a registered medical man." On the other hand, in Carpenter *v.* Hamilton (1877) the accused had held himself out to be "Dr. John Hamilton, Doctor of Medicine of the Metropolitan Medical College of New York," and it was never proved that he did not possess this qualification. "How is it possible," asked Baron Cleasby in the Exchequer Division, "to make out a charge of falsely pretending to be something, when the only evidence is that the man pretends to be what he really is?" Baron Martin's exposition of "wilfully and falsely" in Andrews *v.* Styrap is still relied upon. If it is applied to Col. Kynaston's case, it may be easy to say that the defendant used the letters "M.R.C.S. Eng." wilfully "because he did it on purpose"; it is not so easy to say that he did it "falsely" because his original possession of the diploma was justly founded on established grounds of "merit, learning, and skill." The cancellation of the diploma was not due to any reflection upon his "learning and skill." The law may be clearer when Col. Kynaston's litigation is complete.

[1] See THE LANCET, July 13th, p. 95.

BERLIN.

(FROM OUR OWN CORRESPONDENT.)

Murder by Strophanthin.

A medical man, Dr. X., was recently tried for murder in Bonn, in curious circumstances. He had an entanglement with a woman, Mrs. Y., who had been a nurse, which was inconvenient in view of his desire to marry someone else. One evening when Mrs. Y. was in the doctor's house, she was heard to cry out that she had been poisoned, and that she wished to be examined at once at the university hospital. Dr. X. himself carried her to the hospital where he declared to a medical officer that she was very hysterical, but that as she complained of heavy pains in the rectum, a rectal wash-out might be indicated. The woman continued to cry that something had been introduced into her rectum, and as she was very excited, she was at once taken to the clinic for nervous diseases, where she died an hour later. At the autopsy, strophanthin was found in the rectum, whereupon Dr. X., whose behaviour had aroused suspicion, was arrested, and tried for murder. At the trial a chemist gave evidence that some days before Dr. X. had presented a prescription for strophanthin in crystalline form. On being informed that strophanthin was in stock only in solution, he had induced the chemist to procure it in crystalline form. In handing over the drug to the defendant, the chemist warned him that it was a strong poison. Defendant replied that he wished to use it for cauterising the nose of a patient. Medical witnesses gave contradictory evidence; a professor of pharmacology stated that though strophanthin might be used for that purpose it was an uncommon technique. A professor of rhinology declared that he had never heard of strophanthin being used for cauterisation. Defendant said that the woman had complained of pain in the rectum, and that he had therefore performed a rectal examination. Being very hysterical she might have taken the drug from his table and introduced it into the rectum herself for suicidal purposes. He admitted, however, that the dead woman had been his mistress. After a trial lasting four days, which caused a great sensation throughout Germany, Dr. X. was sentenced to death for murder. The case is unique, since murder by strophanthin has never before been recorded. The plea of insanity made by the defendant's counsel was not accepted by the Court.

Legal State of Pharmacies.

Dr. Lustig, a government medical officer, recently read a paper before the Berlin Society for Public Health, on the legal position of pharmacies, which is very variable. Certain pharmacies possess rights connected with certain premises, which may date back some

hundreds of years. The rights may be assigned by the owner to another qualified apothecary. Since 1894 no franchises have been granted, but only a personal licence which entitles the owner to open a pharmacy in a street or in a district prescribed in the licence. The licence being strictly personal, it may not be sold to another apothecary; it is annulled by the death of the owner, but the widow may have the pharmacy managed by a locum tenens until her death. The number of pharmacies in Germany is 5600, but there are in Berlin for every pharmacy 6½ drug stores. In the discussion it was stated that the number of pharmacies is much too small; at present no apothecary qualified after 1902 has any chance of being granted a licence, so that the majority of apothecaries are well over 50 before they are able to establish business on their own, if they have not the money necessary to buy one of the old franchised pharmacies. The majority of chemists desire neither a nationalisation of pharmacies nor absolute freedom for qualified apothecaries to open a pharmacy when and where they like, but they want a considerable increase in the number of licences.

The Health of Germany.

The report on the health of Germany in 1927 has lately been issued. It states that the density of the population has increased since 1910 from 124 to 133 per square kilometre, and that of the greater towns from 21·3 to 26·8 per cent. of the entire population. The number of births, being 18·4 per mille, has again decreased by 1·1 from the 1926 figure. Of the European countries, only France and England have a still smaller proportion of births to the population. The general mortality has slightly increased, by 0·4. Infant mortality has decreased to 9·7 against 15·1 in 1913. Of infectious diseases scarlet fever has increased, while measles and diphtheria have kept at the low level observed since the end of the war. Puerperal fever has decreased in incidence of case and in mortality. Of venereal diseases, soft chancre and syphilis have decreased, especially in the larger towns, obviously a result of the systematic attack on these diseases. The mortality of tuberculosis has decreased from 10 to 9·3 deaths per 10,000 inhabitants; Germany has the lowest mortality of all the European countries. The mortality of cancer has increased, being 10·5 per 10,000. The incidence of nervous diseases has increased from 3·1 in the period from 1881 to 1905, to 13·8 per 10,000 inhabitants in 1927. The health of school-children has improved; according to the reports of the school medical officers, 40 per cent. of the children were in a good, 50 per cent. in a satisfactory, and only 10 per cent. in an unsatisfactory state of health. About 5000 dispensaries for infants and little children exist; 350,000 children were sent from towns to the country for recreation. The number of hospital beds per 1000 was 5·5 against 4·3 in 1913.

Statistics of Cholelithiasis.

Dr. Lowe and Dr. Noah have examined 208 cases of cholelithiasis, treated without operation by internal medication. Of the cases followed for at least two and up to seven years, 3·9 per cent. were free from pains, 21 per cent. were not cured, and in 40 per cent. the state was satisfactory. The patients free from pain were for the most part older, whilst 50 per cent. of the uncured patients were under 40 years at the time of their first attack. The results of surgical treatment collected from medical literature were better. Cures claimed by different authors varied between 60 and 80 per cent., the mortality being 4 per cent. The figures for fatal termination in cases treated medically vary between 0·4 and 15 per cent., these wide variations being probably due to the different types of patients; some statistics concern hospital patients, others private patients. The majority of patients who were free from pain had followed no dietary rules, whilst in the uncured a strict diet was ineffective in 80 per cent. The prognosis appears to depend not on the intensity but on the frequency of the attacks; 23 per cent. of the cases gave a family history of cholelithiasis.

RHEUMATISM IN KENSINGTON.

ITS RELATION TO RATS AND DAMP.

IN THE LANCET of June 29th (p. 1363) we commented on the first annual report of the Royal Borough of Kensington upon its Rheumatism Scheme. The authors, Dr. James Fenton and Dr. R. C. Lightwood, made a careful study of the relation between the incidence of acute rheumatism and certain environmental factors, particularly dampness of the soil and infestation by rats. The number of cases was small, but the data are so suggestive that they deserve the closest consideration of all workers on this problem.

The relevant statistical information for the various wards of Kensington is as follows:—

—	Population per residential acre.	Death-rate.	Infant mortality-rate.	Cases acute rheumatism notified.
St. Charles..	173	12·9	77	34
Golborne ..	366	13·8	89	44
Norland ..	156	14·5	80	55
Pembridge..	138	14·1	69	14
Holland ..	67	13·4	67	9
Earl's Court	110	13·7	36	1
Queen's Gate	117	13·2	30	1
Redcliffe ..	117	14·5	56	1
Brompton ..	108	11·3	55	0

Damp Soil.

A damp soil has been believed from time immemorial to predispose its inhabitants to acute rheumatism, but recent work has tended somewhat to shake this view. Kensington is a good area in which to study the significance of damp, for it is traversed by several underground streams, which carry off the overflow from the main drainage system in wet weather and discharge it into the river. Until very recently the coincidence of heavy rain and high tides caused flooding in certain areas. In order to discover whether the distribution of acute rheumatism followed these flood areas, the authors prepared a map of the borough and plotted upon it the houses from which the 159 cases had been notified (Fig. 1). On the same map they marked the flood areas, the exact extent and distribution of which were well known. It was at once apparent that the rheumatism notifications showed a definite grouping in certain heavily populated portions of North Kensington, but the correspondence with the flood areas was not by any means close. South Kensington, which contains only one flood area, but that the largest in the borough, notified only one case. The housing in this flood area of Holland Ward consists of property of comparatively high rateable value, while the property in the flood areas of Notting Dale is rated as low as any in the borough. The authors conclude tentatively that either: (1) dampness of site is not the important factor, unless the housing is in some way defective; or (2) the general, social, and hygienic conditions which go with density of population are of equal or greater importance than dampness itself. Eton College, they remark, stands on low-lying ground by the river, but the incidence of rheumatism among the boys is very low; the adjoining property in Eton town, on the other hand, has a much higher incidence than that of the College. The incidence of rheumatic fever among the troops in winter in Flanders was low, although at times they were living in conditions of dampness almost unbelievable.

Rheumatism in Rat-infested Areas.

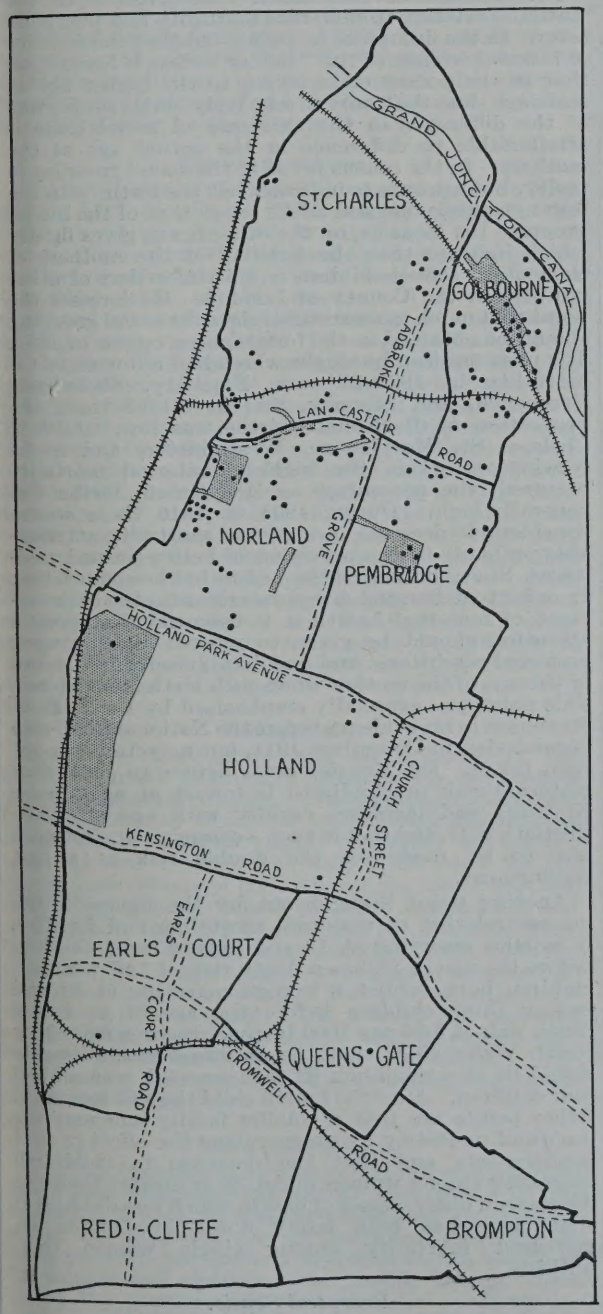
Dr. Fenton and Dr. Lightwood then turned their attention to a factor which has probably never before been studied as a possible concomitant of acute rheumatism. At a meeting of the Epidemiological Section of the Royal Society of Medicine in February, 1928

Dr. J. Tertius Clarke brought forward evidence to show that the geographical distribution of rheumatic fever coincided with that of the common rat-flea, *Ceratophyllus fasciatus*. Although Dr. Clarke admitted that his evidence was by no means complete, the authors of the Kensington Report felt that data on the comparative incidence of rheumatism and rat infestation might be of interest. *C. fasciatus* is essentially a nesting flea, and its larvæ do not thrive outside a rat's nest. A marked correspondence between the distribution of rats and that of acute rheumatism would, they considered, suggest that any geographical correspondence between the rat-flea and rheumatism might be something more than a coincidence. The rat-infested areas of the borough were known to the Public Health Department, and were marked off on the map showing the position of the 159 cases of acute rheumatism. It was then apparent that the distribution of rats corresponded to a considerable extent with that of the rheumatism (Fig. 2).

Common Factors.

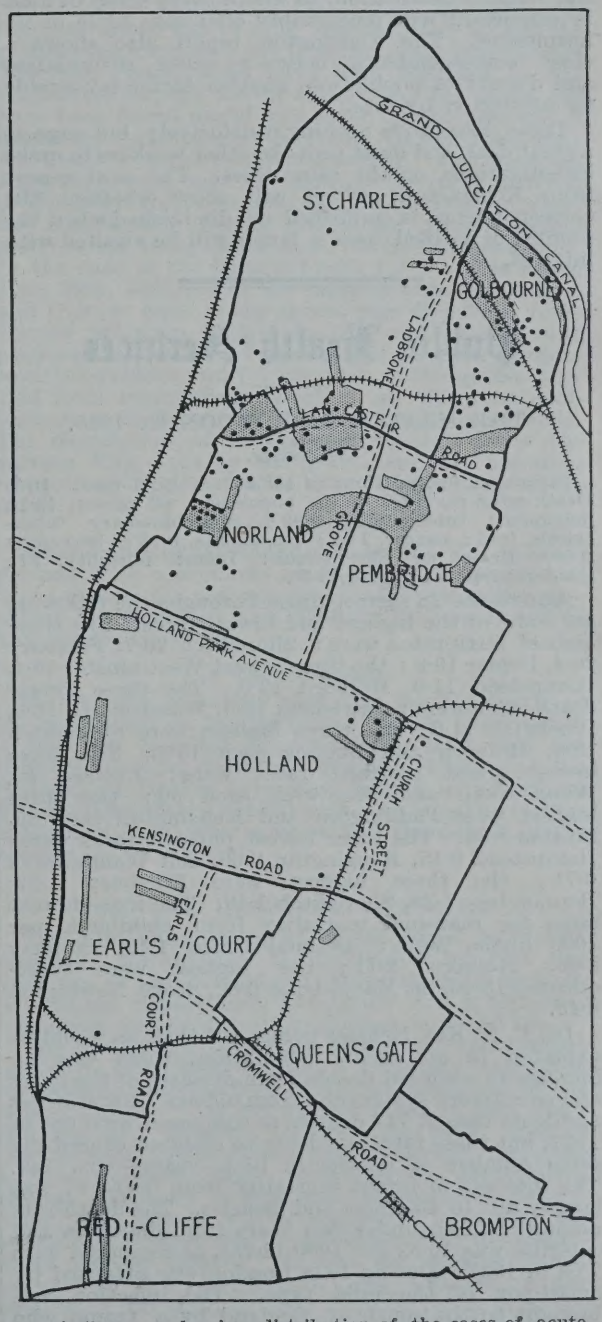
The authors then considered whether there was any third factor common to both which would account for an indirect association between them. The favourite breeding-grounds of rats are railway embankments, allotments, goods yards, warehouses, and similar places, where they are comparatively undisturbed during the night and at week-ends. The map in Fig. 2 shows that rat distribution follows the railway lines to some extent. There is also a certain correspondence between the course of the

FIG. 1.



Map of Kensington showing distribution of the cases of acute rheumatism (black dots) in the several wards of the borough, and the damp areas (shaded).

FIG. 2.



A similar map showing distribution of the cases of acute rheumatism (black dots) and the rat-infested areas (shaded).

railways and that of the old streams. In order, however, to regard the railways as a third factor producing an indirect association between rats and acute rheumatism, it is necessary to assume that dampness and acute rheumatism are related. The report mentions, however, another fact which suggests that rats and rheumatism are related, whether causally or not. Both occur most frequently in defective houses, where rats can gnaw their way into the spaces below the floor-boards in the basement and ground-floors. Rats, moreover, are attracted by untidy yards and kitchens. As we remarked in our previous comment, the work of other investigators has shown that acute rheumatism is very common in needy households, but is rare among the very poor. Social workers know well that the inhabitants of the class of premises which are infested by rats tend to be untidy and wasteful in their manner of life, while persons on the verge of destitution, to whom every scrap of food is important will presumably offer rats little or no hospitality. The Kensington report also shows a close correspondence between acute rheumatism and density of population, another factor favourable to infestation by rats.

These data prove nothing conclusively, but suggest a great deal, and must provoke other workers to make investigations on the same lines. The next report from Kensington, which will show whether the correspondence is confirmed or diminished when the number of notified cases is larger will be awaited with interest.

Public Health Services.

THE HEALTH OF LONDON IN 1928.

Statistics.

Estimated population, 4,458,200. Birth-rate, 16·2. Death-rates per 1000 of the population, all causes, 12·1; pulmonary tuberculosis, 0·89; non-pulmonary tuberculosis, 0·14; cancer, 1·52; pneumonia, 0·93; bronchitis 0·59. Rates per 1000 births: Infant mortality, 67; maternal from childbirth, 3·59.

AMONG the 28 metropolitan boroughs the following are some of the highest and lowest rates. The three highest birth-rates were: Shoreditch 20·7, Finsbury 20·4, Poplar 19·9; the three lowest Westminster 10·4, Hampstead 11·6, Holborn 12·0. The three lowest death-rates were: Lewisham 10·0, Wandsworth 10·9, Woolwich 11·0; the three highest were Shoreditch 13·6, Holborn and Chelsea each 13·5. The three lowest infant mortality-rates were: Chelsea 48, Wandsworth and Woolwich each 50; the three highest were Paddington and Kensington each 85, Finsbury 84. The three lowest phthisis rates were: Hampstead 0·45, Kensington 0·60, and Wandsworth 0·71; the three highest were Finsbury 1·29, Bermondsey 1·28, Shoreditch 1·19. The three lowest rates for maternal mortality from childbirth per 1000 births were: Bethnal Green 1·40, Stepney 2·00, Holborn 2·11; the highest were Westminster 13·06, St. Marylebone 6·82, Stoke Newington 6·45.

Dr. F. N. Kay Menzies points out that, as would be expected in an ageing population, there was an increase in recorded deaths from diseases of the heart and circulatory system and from old age. Fatal street accidents caused 747 deaths, as compared with 669 in 1927, but these fatal accidents to children caused the same number of deaths in both years—viz., 149. The increase in infant mortality from 59 to 67 was largely due to diarrhœa and measles. The death-rate among children under two years from diarrhœa and enteritis was 10·32 per 1000 births, as compared with 7·59 in 1927. During 1928 London was attacked by small-pox of the mild type. The infection was brought to the south of England by a tramp who reached a Sussex casual ward in a collapsed condition in December, 1927, but the nature of his illness was not suspected until secondary cases occurred a fortnight later, the diagnosis being then confirmed by the council's small-pox consultant. By this time vagrants infected in this casual ward had spread the disease over the countryside. In all there were 285 confirmed cases, with one death in Southwark. The London experience showed that vaccination protects equally against the mild and the more virulent forms of small-pox.

The deaths from measles totalled 1358, the highest number since 1922. Measles was prevalent in London both in 1917 and 1918, and since then has been epidemic in alternate years. It is due again next winter and likely to be accompanied by a prevalence of whooping-cough above the average.

Maternal Mortality.

Dr. Menzies devotes much consideration to the statistics relating to maternal mortality and puerperal fever. In the first place he points out that the fertility of married women of the "better" class is lower than that of the poorer class owing to the higher age at marriage, but that only a relatively small proportion of the difference in the extremes of social class is attributable to difference in the actual age of the mothers. In the census for 1911 the social grouping is faulty, but appears to indicate that the fertility in the lower groups is one and a half times that of the higher groups. Dr. Menzies, on the other hand, gives figures which indicate that the fertility of the mothers of elementary school-children is 3·6 times that of other mothers in the County of London. He stresses the point that much more accurate data for social grouping should be obtained in the forthcoming census of 1931. The metropolitan boroughs which had a low maternal mortality in 1920–27 were Finsbury, Shoreditch, Greenwich, and Stepney, and in all of them the proportion of illegitimate births was low, whilst in Chelsea, St. Marylebone, Westminster, and Stoke Newington, where the highest maternal mortality occurred, the percentage of illegitimate births was generally high. During 1901 to 1910 there was a considerable decrease in maternal mortality attributable probably to the provision of better-trained midwives. Since this period the decline has been much less. In order to define and direct measures for the improvement of maternal health is is essential that greater attention should be given to records bearing upon maternal conditions, and one detail needed is a record of the age of the mother when each birth is registered. This point was especially emphasised by Dr. T. H. C. Stevenson in his evidence before the National Birth-rate Commission in December, 1914, but no action has yet been taken. Dr. Menzies gives figures to show that maternal risk in childbirth is lowest at ages under 25 years and increases rapidly with age after the thirtieth year, and that in such a comparison allowance has to be made for the double risk at a first confinement.

Another point brought out by the figures is the inverse relation of maternal mortality and fertility. A woman marrying at 18 and having three children before the age of 25 has a death risk of 2·07 per 1000 children born, whilst a woman marrying at 33 and having three children before the age of 40 has a death risk of 5·86 per 1000 births. Figures from New South Wales show that the maternal mortality-rate would be at a minimum if each married woman had four children. After the fourth child the risk increases. Other points are that a smaller family increases the maternal mortality by exaggerating the effect of first confinements and that the decrease in childbirth mortality among women under 30 is greater than the decrease in other causes of death, which recalls the fact that there has been lately noted in London an increased mortality among single women from phthisis.

Puerperal Sepsis.

Dr. Menzies questions the deductions made in the Aberdeen report on puerperal sepsis, issued by the

cottish Board of Health in 1928, and gives his easons for so doing. He goes on to produce evidence hat the resistance to puerperal fever diminishes harkedly with age, and to show fluctuations in the nnual puerperal sepsis rates, which indicate a close nterdependence of movements in the mortality from rysipelas, puerperal fever, and scarlet fever, an interependence which was pointed out 50 years ago by)r. G. B. Longstaffe in a paper read before the pidemiological Society. There are no reliable gures available as to the percentage of sterile women, nd the operations of birth control in reducing ertility is an unknown factor. Economic stress by ncreasing the proportion of unwilling mothers may rejudice the normal risk and excessive spacing of onfinements may also increase the risk by bringing bout conditions approximating to those of first onfinements. The conclusion drawn from this tatistical analysis is that the sustained rate of naternal mortality, in spite of improvements in the naternity service, is in general terms the result of the epression of natural fertility brought about by conomic conditions, but the tentative character of he statistics is stressed and the need for more detailed ecords relating to the maternal state.

Disease Incidence.

The notifications of *enteric* showed an increase from 22 in 1927 to 580 in 1928, largely owing to the utbreak of paratyphoid B attributed to infected ream. There were 41 confirmed cases of *poliomyelitis*, f which 9 ended fatally. There were five more fatal nnotified cases of this disease. There were 83 onfirmed cases of *encephalitis lethargica* of which 27, r 32 per cent., were fatal. There were 22 additional eaths from this disease amongst unnotified cases, in nany of whom the post-encephalitic symptoms were ot observed until years after the mild primary illness. The M.A.B. has now provided 50 beds for persons over he ages of 16 suffering from post-encephalitic symptoms. *Influenza* caused 590 deaths as compared with 815 in 1927, but during the last weeks of 1928 there were signs of an epidemic in the north which later ecame general, and in the first quarter of 1929 there were more deaths from influenza than in any first uarter since the great epidemic of 1919. *Acute heumatism* under 16 is now notifiable in Holborn s well as in Kensington and Paddington. A comparison of the mortality from acute rheumatism in arious groups of boroughs lends no support to the ffect of social conditions in the causation of this isease.

Tuberculosis.

There has been practically no decrease in the nortality from pulmonary tuberculosis in London uring the past three years. The experimental scheme, egun in 1926, by which the tuberculosis dispensaries ould obtain artificial light treatment at certain ospitals and centres, was very little used by the uberculosis officers of the 19 boroughs concerned, and urther experience confirms the view expressed in last ear's report that the best results are obtained when ight treatment is given as an addition to the fresh air, ood food, and regular régime provided in a residential nstitution in the country. The present scheme is herefore to be dropped. The scheme for boarding ut children who are contacts with advanced pulnonary tuberculosis has been continued; 149 hildren were accepted and 52 were being boarded out t the end of the year.

Underground Rooms.

Existing legislation for the control of underground ooms has been directed almost exclusively to the egulation of such as sleeping-places, but Dr. Menzies oints out that the use of basement dwellings as iving rooms is particularly injurious to the health of he women and children, who mainly occupy them uring the daytime and that there is no statutory ower to close only part of a house. The council is herefore considering the promotion of further legislation to deal with the whole problem of underground rooms.

Milk.

During 1928 the biological examination of 1605 samples of milk from 40 counties was completed and 143, or 8·9 per cent., were found to be tuberculous. As the result of following up by various county medical officers of health 66 tuberculous cows were found and slaughtered under the Order. The difficulty of tracing is greatly increased by the bulking of the milk at country depôts prior to despatch and this is more than ever the case since the introduction of glass-lined tanks. For example, one of these containers may hold 3000 gallons of milk, which may have come from 200 farms. On the one hand, the introduction of a single infected milk infects the whole of the tank; on the other hand, a massive dose of tubercle bacilli is diluted. The attention of the Ministry of Health has been drawn to this matter. Another point that has arisen out of milk examinations is that the guinea-pigs frequently die from an acute intercurrent infection. Such cases have been reported to the authorities responsible for supervising the farms and have been found useful as a lever for the removal of insanitary conditions on the farm. In 1888 there were 738 licensed cowhouses in the county. In December, 1928, there were only 55, chiefly in the rural districts of Woolwich and in Stepney and Bethnal Green, where the considerable Jewish population, from religious motives, are always anxious to obtain fresh raw milk. In the case of the imported milk for the year ended June 30th, 1928, 7·6 of the samples were tuberculous and 18·9 per cent. of the guinea-pigs died from intercurrent infection, whilst in the case of the milk produced in London 6·7 per cent. of the milk samples were tuberculous and 7·5 per cent. of the guinea-pigs died from intercurrent infection, so that the comparison is in favour of the London-produced milk. The description of the powers wielded under the various Milk Acts by the L.C.C. and the boroughs respectively appears to be dual responsibility at its worst.

Venereal Diseases.

The number of attendances under the V.D. scheme per new V.D. case shows another great increase, and the number of non-venereal cases attending the clinics has increased from 2360 in 1917 to 10,164 in 1927, and 9595 in 1928.

A New Hospital.

Dr. Menzies mentions that the rapid growth of the population on the Becontree Estate has created a need for hospital accommodation and that the trustees of King Edward's Hospital Fund and the Ministry of Health have each agreed to contribute £10,000 towards the capital cost if an equal amount is subscribed from other sources and the details of the scheme are satisfactory.

MENTAL HOSPITAL REPORTS.

THE 116th annual report of the *Royal Edinburgh Hospital, Morningside*, is illustrated by two line drawings of the Jordanburn Nerve Hospital and the out-patient department, and opens with a historical retrospect and survey of psychology in social life.

The Jordanburn Hospital is an entirely new venture under the new Charter, and is a voluntary institution for patients suffering from all that is comprised by the term "nerves." Its out-patient clinic is held every morning and provides facilities for every modern psychological investigation and treatment, including a child guidance clinic, social service department, mental deficiency section, and neurological department. The scheme will be completed later with the erection of laboratories in connexion with the magnificent lecture theatre. In the six nursing homes associated with Morningside and situated in the suburbs of Edinburgh, there were 63 patients at the end of 1928. These are specially equipped for nerve patients, and each has its own peculiar features, so

that a change from one to another can often be made with benefit. The number of admissions, from all parts of Great Britain, is steadily increasing. At the main institution there were at the end of the year 155 voluntary and 705 certified patients. During 1928 applications for admission were received from 114 voluntary patients, and 98 certified. The medical superintendent discusses again the lamentably small number of poor voluntary patients received into the mental hospitals of the country. The usual details and tables are not supplied with this report.

The 128th report of the *Aberdeen Royal Mental Hospital* for 1928 records that there were 810 patients at the end of the year; 21·8 per cent. of the private admissions were on a voluntary basis, but only two rate-aided voluntary boarders were admitted. Seventy-six of 181 admissions were suffering from some bodily illness, and 12 from epilepsy. One general paralytic was discharged as cured without having had any special treatment, and five were able to return to work after malarial inoculation. The total recovery-rate was 25·96 per cent., and the death-rate 8·3 per cent. Six cases of paratyphoid occurred on the female side, and there were two cases of scarlet fever. T.A.B. vaccine and scarlatinal antistreptococcus serum were used respectively to immunise the contacts. The dentist examined over two hundred patients, of whom 170 required treatment. Eighty-two patients received ultra-violet radiation, most of them on account of physical conditions; anæmia was benefited and sleep, appetite, and weight improved. No lasting mental improvement was observed. Nearly a hundred cases were X rayed during the year. Rather more than a hundred patients were employed in the occupational therapy department on very varied crafts, and many discharged patients continue the work in their own homes. Research work is being carried on in the laboratory in addition to a large number of routine investigations. A cinematograph with non-inflammable films has been bought for the branch institution at Daviot, and has given much pleasure; one unfortunate patient had never seen a moving picture before, and was greatly alarmed at the first entertainment!

The *Glasgow Royal Asylum* publishes for 1928 its 115th annual report, illustrated as usual by a number of photographs. There were 536 patients resident at the end of the year, and 68 of the 135 patients admitted were voluntary boarders. Forty-five patients were discharged recovered and 34 greatly improved. The death-rate was 4·7 per cent. In redecorating the building attention has been paid to the influence of colour schemes on mental health. The kitchen has been centralised and reorganised, and much labour saved thereby. The seaside home at Skelmorlie and the nursing home at Dowanhill continue to render valuable service. The visiting dentist reports that he saw 204 patients, and practically none of them objected to treatment. The occupational therapy officer describes a very successful year in her department. Many patients on parole spend their day there, and some of them take away material to work at in their rooms. Every now and then a handicraft is dropped altogether so that it can be taken up later with a feeling of novelty. Nurses and attendants work among the patients and help the atmosphere of industry and life in the department. The amount realised from sales has more than defrayed the cost of materials. Four nurses and five attendants passed the senior examination of the General Nursing Council. The medical superintendent emphasises again the need for a psychiatric clinic, and discusses the popular attitude to mental illness.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED JULY 20TH, 1929.

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 144 (last week 115); scarlet fever, 1864; diphtheria, 949; enteric fever, 56; pneumonia, 935; puerperal fever, 46; puerperal pyrexia, 87; cerebro-spinal fever, 12; acute poliomyelitis, 9; acute polio-encephalitis, 1; encephalitis lethargica, 28; continued fever, 2; dysentery, 11; ophthalmia neonatorum, 129. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the Metropolitan Asylums Board on July 23rd–24th was as follows: Small-pox, 173 under treatment, 3 under observation (last week, 198 and 11 respectively); scarlet fever, 1405; diphtheria, 1645; enteric fever, 11; measles, 298; whooping-cough, 373; puerperal fever, 31 (plus 11 babies); encephalitis lethargica, 124; "other diseases" 24. At St. Margaret's Hospital there were 19 babies (plus 10 mothers) with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns, including London, there was no death from small-pox, 3 (1) from enteric fever, 38 (8) from measles, 1 (0) from scarlet fever, 25 (8) from whooping-cough, 16 (4) from diphtheria, 65 (13) from diarrhœa and enteritis under two years, and 27 (2) from influenza. The figures in parentheses are those for London itself.

Birmingham and Liverpool each reported 6 deaths from measles, Leeds 4, and Bradford 3. Whooping-cough claimed 3 victims in Birmingham. Diarrhœal deaths were at their maximum in Liverpool 8, Birmingham 7, and Wolverhampton 3.

The number of stillbirths reported during the week was 291 (corresponding to a rate of 42 per 1000 births), including 50 in London.

Death from Small-pox.

THE fatal case reported last week from Stepney was that of a female infant, aged 3 days, whose certificate was filled up thus: 1. (*a*) Small-pox; (*b*) Unvaccinated, born with a rash, mother suffering from small-pox: 2. Prematurity. Dr. D. L. Thomas, medical officer of health, tells us that the infant's mother, having had a rash for about a week, was taken with labour pains on June 29th and removed to the Mile End Hospital where she gave birth a couple of hours afterwards. The baby, it seems, showed no rash for the first 12 hours, but when seen on July 1st had a profuse eruption. The case is an interesting one, inasmuch as the baby contracted the disease in utero.

ROUSSEAU'S RETREAT AS TUBERCULOSIS HOSPITAL. The Stoke-on-Trent City Council has obtained an option for the purchase of Wootton Hall as a tuberculosis hospital. Wootton Hall, which is romantically situated on the Staffordshire bank of the Dove, was from March, 1766, to May, 1767, the home of J. J. Rousseau, who there wrote the early part of his "Confessions." The village of Ellastone in which it stands is the Hayslope of "Adam Bede," and Wootton Hall is the Donnithorne Chase of that book.

VILLAGE SETTLEMENTS AND CENTRES.—Last week the Duke and Duchess of York paid their second visit within five years to the Papworth (Cambridgeshire) Village Settlement for Consumptives. The Settlement, which came into existence 12 years ago, with two shelters in a garden, is now a community of 700 persons who are able to support themselves by various handicrafts. The ex-patients live in cottages amid perfect sanitary conditions, and although 160 children have been born of parents one of whom was tuberculous, no trace of the disease has been found in any of them. The Papworth Industries have increased their turnover from a few hundred pounds in 1918 to £54,000 in 1928, and men and women who would normally be unemployable have received £112,000 in wages.—At the annual meeting last week of the Village Centres, Curative Treatment and Training Council, Incorporated, Field-Marshal Lord Plumer, who presided, reported that the income had fallen off. No appeals for money were made during the last two years, for fear of conflicting with those for the Haig Memorial Homes, nor had there been any appeals on Armistice Day, yet only £16,500 had been received from the British Legion. The factory is working efficiently, but it was stated that an income from donations and subscription of at least £7000 per annum is required; last year there was a loss of £400.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

Adjournment for Summer Recess.

Parliament adjourned on Friday, July 26th, for the summer recess. Both Houses will reassemble on Tuesday, Oct. 29th. The Royal Assent was given by Commission to the following Acts:—Colonial Development Act and the Housing (Revision of Contributions) Act.

Poor-law Administration.

In the House of Commons on Tuesday, July 23rd, Mr. Neville Chamberlain moved that a humble address be presented to His Majesty praying that certain Orders made by the Ministry of Health, dated June 27th, 1929, in reference to the Bedwelty, Chester-le-Street, and West Ham Unions, in which appointed guardians are functioning under the Guardians (Default) Act, should be annulled. He said that the Orders purported to extend the period of office of the present appointed guardians until August 2nd, but he understood that the Minister of Health intended to dismiss them on that date and by a new Order to substitute other appointed guardians who would function until April 1st next. Since the appointed guardians had been at work all further borrowing by the unions concerned had ceased and the financial position had improved. In addition, the West Ham appointed guardians had increased the efficiency of the medical and nursing service at the hospital by appointing four consultants—a gynæcologist, an orthopædic surgeon, an ophthalmic surgeon, and a neurologist. They had appointed a dentist and an anæsthetist, they had added one medical officer to the staff, and had substituted 14 staff nurses for a corresponding number of probationers. In the children's homes they had provided a new and more varied diet at an additional cost, and had changed the clothing of the children, which was heavy and unsuitable, for lighter and healthier garments. They had encouraged games and outdoor exercises for the children, and had also encouraged them to join the local groups of boy scouts and girl guides. In place of part-time district medical officers full-time medical officers had been appointed, and the number of district nurses had been increased. The report on their work showed that not only was the administration of the old guardians extravagant but also grossly inefficient, and the hard-hearted, callous bureaucrats, as they were described by hon. Members who did not approve of anything that the late Government did, had really effected a revolution in the efficiency of the service as well as in the financial position. Now these people were to be swept away as if they had done something to be ashamed of instead of pulling West Ham out of chaos into order, and in their place were to be put people who would be nominated by the local authority. In view of statements which had been made by members of the Labour party in the West Ham area, and the fact that under the Local Government Act something like £250,000 of public money was to be handed over from the Exchequer to be distributed in that area towards the local rates, he thought there was danger in the course which the Minister of Health proposed to take. He hoped that Mr. Greenwood would indicate that he stood up for the best principles of poor-law administration, and that he was not prepared to commit himself to practices such as those which led to the passing of the Guardians (Default) Act.

Mr. Greenwood, Minister of Health, said that he wished to see boards of guardians doing their honest duty in an enlightened and humane way, without extravagance and without placing an enormous burden on the other people who were paying the rates and who in many cases he realised were very little better off. He had no reason to believe that they would not get wise and fair administration from the newly appointed boards of guardians when they took office. All or most of them were persons of considerable experience; they were being given a trial trip and they would be able ultimately to introduce the county councils and the county borough councils in those areas to the real problems which they had to face. He could think of no other way of dealing with the question than the one he had adopted. He could not have squared it with his conscience to leave the three appointed guardians there for another eight months.

After further debate,

The Constitutional Issue.

Miss Susan Lawrence, Parliamentary Secretary to the Ministry of Health, said that there was a serious constitutional issue involved. The late Minister of Health took power to himself to appoint three persons or any number that he liked as guardians. He fixed their salaries and he could appoint them for a given time. For the acts of these persons the Minister was not accountable to Parliament. It might be said that there were precedents. Mr. Chamberlain had tried to cover himself with the name of Mr. Gladstone by pointing out that the great Act of 1870 allowed of the supersession of a school board and the appointment by the Minister of substitutes. But in that case the Minister had to certify the expenses of the displaced school board, which brought them under full Parliamentary control. So in later Acts, such as the Public Health Act of 1875, the power was taken to place the Minister—that was Parliament—in the room of local authorities, but there was not a single other Act which allowed the Minister to have at his disposal persons for whom he could not answer to Parliament. It would be a real danger if such a class of persons were allowed to grow up, particularly in local government. They saw abroad the degradation of local government by these quasi-executive ambiguous officers like burgomeisters and préfets, persons clothed with the authority of the executive and charged from headquarters with keeping the local authorities in their places. Whatever might have been wrong the remedy put forward by the Guardians (Default) Act was the wrong remedy.

Mr. Chamberlain: Will the hon. lady explain how she has met that constitutional point in the change which is proposed to be made by these Orders?

Miss Lawrence: Unless some Order of this kind was made there could be no board of guardians. We could not have an election without legislation and we could not allow all poor-law relief to lapse. We therefore made what I call a gesture and handed over in effect the nomination of these persons to the elected authorities who will deal with them now.

The motion for an address was negatived by 284 votes to 154.

The Housing Subsidy.

The Housing (Revision of Contributions) Bill passed through Committee and was read the third time and passed.

The National Radium Trust.

On Wednesday, July 24th, the House went into Committee on a supplementary vote of £100,000 as a grant-in-aid of the National Radium Trust. Mr. Dunnico, Deputy Chairman of Committees, was in the Chair.

Mr. Greenwood, Minister of Health, said that he did not imagine that there would be much controversy about this vote. It was an inheritance which had come to him from the late Government, and its purpose was to provide for a grant-in-aid of the National Radium Trust, subject to a maximum of £100,000, based on £1 for every £1 of voluntary subscriptions; for augmenting the supply of radium for use in the treatment of the sick, and for the advance of knowledge of the best method of rendering radiological treatment. The money would be expended by the trust under the terms of a Royal Charter incorporating that body. The recommendations of the Radium Subcommittee of the Civil Research Committee, published in a report early this year, were accepted in principle by the late Government subject to further consideration on matters of detail. Since that time a consultation had taken place with the leaders of the various branches of the medical profession, and certain minor changes had been made in the proposals of the subcommittee. It was finally thought to be expedient to appoint the Radium Trust and the Radium Commission through the instrumentality of a Royal Charter, and a Royal Charter had now been received from the King empowering the establishment of the Trust and the Commission. The Trust would hold the money and would be responsible for the actual ownership of the radium. The Commission would be the body responsible for its custody, care, and utilisation. The Radium Trust would consist of the Lord President of the Council, who would be chairman, the Minister of Health, the Secretary of State for Scotland, the President of the Royal Society, the President of the Royal College of Physicians of London, the President of the Royal College of Surgeons of England; the chairman of the Central Liaison Committee for Voluntary Hospitals in Scotland, the President of the Royal Society of Medicine, and the President of the British Medical Association. The Trust were also required to coöpt two medical members of the Commission and might coöpt not more than three other persons. That matter was now under consideration, and it would be the function of that body to accept and to hold the funds which had been subscribed and to purchase the radium. The Radium Commission, which would be responsible for the custody, distribution, and use of the radium, would consist of a chairman to be appointed by the Trust; four members nominated by the Minister of Health, the Secretary of State for Scotland, the Medical Research Council, and the Department of Scientific and Industrial Research; and six members having special knowledge and experience of the application of radium in the treatment of the sick. These six persons were to be appointed by the trustees from a panel of 12,

and would be selected by the heads of the medical profession named in the Royal Charter. A meeting was being held that week at which the panel of 12, he understood, would be selected. Within a few days a preliminary meeting of the Radium Trust would be held and arrangements were being put in hand as rapidly as practicable under the circumstances. It was quite clear that as these bodies had not yet formally met that there might be some little delay in getting the scheme fully into operation. The radium had to be purchased, and purchased under the most advantageous terms. The Commission had to consider what were the best and most effective ways in which the radium could be used, but the Lord President of the Council and he had been very anxious that the scheme should be put into operation, and within a day or two the Trust would hold its first meeting. The Vote would be accounted for by the Ministry of Health but the expenditure of the grant-in-aid would not be accounted for in detail by the Controller and Auditor General. By the terms of the Royal Charter the accounts of the Trust and the Radium Commission were to be prepared in the form and audited in the fashion that the Treasury might direct, and the Radium Trust were required, if the Treasury so desired, to furnish to Parliament reports and audited financial statements relating to the work of the Trust and the work of the Commission. He understood that the Treasury proposed to ask the Auditor General to audit the accounts of the Trust and Commission, and to direct the Trust, as it had power to do, to furnish an annual report including its audited financial statement to Parliament. In that way Parliament would be able to keep control over that part of the fund which had been raised from public sources.

The Increasing Demand for Radium.

Sir KINGSLEY WOOD said that the expenditure of this money represented a substantial step in the campaign against one of the most distressing maladies known to mankind. Unfortunately the cases of cancer in this country were on the increase, and up to the moment no investigation had been able to show the cause of the disease. He thought, however, that it was generally agreed that radium was one of the most hopeful forms of treatment to-day and the demands for it in this country were increasing and urgent. The expenditure of this money was attended with a certain amount of difficulty because radium was found in only a few spots in the world and was a very costly substance indeed. One was almost driven to the conclusion that the money that was to obtain 20 grammes of radium for this country would have to be expended in a country which was practically the only country supplying radium in any quantities to-day—namely, Belgium. He hoped that the greatest care and vigilance would be exercised in order to avoid undue demands being made on this country in the matter of price. It did not appear that at the present moment any of this money could be spent in the British Empire. It would, however, be a great blessing to mankind and desirable, from the point of view of expenditure, if radium in any quantities could be found in Australia or in any other part of the British Empire, or for that matter in any other part of the world. He did not say for a moment, because he had no evidence of it, that there was a hold up in this connexion. It was right that they should remember that the process of extracting radium was very expensive. It was a matter of regret to read in the report that while it was perfectly true that the radium practice was as good in this country as in any other, certainly we were not leading the way in developing the treatment and such countries as Sweden and France were ahead of us in the provision which they made for the treatment of cancer. He hoped that we should not remain much longer in a secondary position in regard to that matter, quite apart from the expenditure of this money. He would suggest to the Minister of Health the advisability of increasing the number of surgeons associated with radium treatment. Not only did they want a great deal more radium but they wanted a good many more skilled people to administer it. Radium was a double-edged weapon, and if it was used unskilfully it could undoubtedly bring tremendous mischief in its train. He hoped that there would be fair treatment in regard to the distribution of radium among the various hospitals up and down the country. He knew, having regard to the amount of radium available, that up to the present time there had been a great waste going on, and he thought that the various kinds of diseases likely to be successfully treated by radium should be concentrated in certain centres. This would allow a great saving to be effected. One had to recognise the various individual interests of hospital associations, and he was afraid in many respects that what he had suggested might be somewhat difficult in practice. In France they had a dozen special centres for radium treatment. In that way they were able to save a good deal of waste and they were able to use radium more frequently to the advantage of the people than we were able to do, because our centres were scattered up and down the country among a larg number of institutions. He was very glad that this estimat had been presented and he was sure that it would mee with approval in all parts of the House. This was a prac tical means of acquiring a sufficient amount of radium t meet the immediate needs of so many people who wer suffering from cancer, and who very often were needlessl suffering from that terrible disease. He was sure that n one in that House desired to challenge the expenditur and the sum of money which would do so much to relieve and he hoped in many cases cure a very large number o people who were suffering from cancer.

The Difficulty in Obtaining Radium.

Dr. HASTINGS said that he hoped that the Committe would agree with the terms of this supplementary estimat because the terrible need for more radium was constantl being pressed upon him. Like a good many other member of his profession who were dealing with cancer he was con stantly finding that he needed radium for the treatmen of his patients, and it was very hard to obtain it. On th previous morning in hospital he saw a good many cases o cancer, and for two of them he needed radium. He aske the radium officer at the hospital with which he was con nected how soon a supply of radium could be obtained, an he said, "Not for a month in either of those two cases. That meant that while those two cases were waiting, and h was waiting to carry out the proper method of treatmen the disease must be steadily advancing. The same thin applied to other hospitals. On the following morning h hoped to be using radium for the treatment of cancer, bu he had had to wait 20 days to obtain the necessary suppl commercially. He was quite sure that every Member o the House wished to see this country take and keep it place in scientific advancement of medicine as well as i other subjects. It was with regret that he had to agre with what was said by Sir K. Wood to the effect that durin the last few years a much greater advance had been mad in radium treatment in Sweden and France than in thi country. Anyone who made inquiries as to why this wa the case would find that the Government of France possesse no less than 31·5 g. of radium, which was allocated to variou treatment centres, whereas, as far as he knew, the Govern ment of this country, through the Medical Research Counci possessed not more than 2·4 g. Some two years ago h had occasion to investigate the results of radium treatmen of cancer of one organ of the body which involved th results of the experience of some 15 years. When he cam to look carefully into those results he was obliged to confes how unsatisfactory they were. Good had undoubtedl been done by treatment in some cases, but he could no point with certainty to a single patient that had been cure But to-day things were very different. During the pas few years extraordinary advances had been made, and no we were able to do with radium things which they neve dreamed were possible two or three years ago. Now, i the opinion of many surgeons, it was better to treat a goo many forms of cancer even in their early stages by radiu rather than by cutting away the growth, because the radiu treatment left the condition of the patient much more lik normal. They had to remember the terrible ravages o cancer at the present time. It was a fact that no less tha 54,000 people died of cancer in this country in 1927. The was no doubt that a good many of those lives might hav been saved if there had been a sufficient supply of radiu in this country to give them the necessary treatmen Treatment by radium was not a simple thing, because required experience and research. The recent improveme in this and other countries in this kind of treatment w the result of research. In his opinion the advances ma in this country had been due to a very large extent to t exceedingly wide use which the Medical Research Coun had made of the 2·4 g. which the Government placed their charge. Efficient treatment by radium meant tw things; in the first place it meant that there must careful, painstaking research, and, secondly, pooled expe ence. When these two things were combined they wou get the advance which they all desired. He wished th the Government had undertaken a bolder policy. T shortage of radium in this country was a national disgra To give help and hope and a fair prospect of a cure those suffering from cancer appeared to him to be a natio duty. He would have liked to see the Government should ing this duty completely; and to leave sufferers from can even to the extent of 50 per cent. to the whims of priva charity seemed to him to be a misfortune. The Gove ment had decreed otherwise, but he hoped that the ne time that they dealt with the sick of this country th would go the whole way.

Sir CHARLES CAYZER urged that the provincial hospit should get equal treatment with the London hospitals in t distribution of radium. He would also like to know whet the provincial hospitals would have the right to send t funds which they had raised locally to the Central Co

mission and ask them to buy radium for them? If that was not so the price might be raised against these provincial hospitals. He asked for an assurance that the provincial hospitals would have a representative on the Radium Commission.

Mr. HAYCOCK expressed disapproval of the dimensions of this Vote. When they thought of the number of people who were suffering from cancer they must realise that they were not even scratching the surface of the problem. He believed that not one person in 50 who ought to get the treatment was getting it. £100,000 was one-eighth of the price of a modern Dreadnought. If they had any sense of proportion they would realise that it was more necessary to spend money on radium than on Dreadnoughts. It did not pay individual surgeons to invest their time and money in learning how to use radium. There were two twin radiologists who decided not long ago that they would commit suicide because they could not afford to carry on. There was a surgeon in Manchester who if he had devoted his time and his very great abilities to an ordinary practice would have made a very large income, but that man after investing his best abilities and his capital was rewarded by poverty. It was a disgrace that real benefactors who were doing something to make this world less a home of agony could not provide for their bread and butter in their old age or ill-health. If the House knew what the real requirements were in regard to the treatment of cancer they would be glad to spend much more than £100,000 on research work and on the purchase of radium.

Reply on the Debate.

Miss SUSAN LAWRENCE, Parliamentary Secretary to the Ministry of Health, replying to questions raised by hon. Members in the course of the debate said that she would remind the Committee that when the new Government took office they found this matter in a very advanced stage. She did not think that the House or the medical profession or the sufferers themselves would have thanked the Government if they had held up the scheme for six months in order to get a better one. Their immediate duty was clearly to subscribe the £100,000 and to get the machinery which was almost ready for work into action at the earliest possible moment. If they were starting again perhaps like many others they could suggest a better machine, but to scrap a machine which was practically in working order would be very wrong. By the fact that there would be one big buyer instead of a number of little ones they were far more likely to be able to obtain radium at reasonable prices. With regard to the possibility of obtaining radium from Australia, the Commonwealth were themselves considering and discussing that matter. The House must exercise a little patience; they would be in a much better position to judge with regard to prices when the Trust had been functioning for some little time. As to the position of the provincial hospitals, the object of the Commission would be to secure the best and most equitable distribution of the radium. The substance was capable of continuous use, and could be used far more profitably if they concentrated treatment in centres able to take a sufficient number of patients so as to secure continuous use of the remedy. It was calculated that the money available—about £384,000—would purchase about 17 g. of radium, and it was the opinion of the experts that they would have as much as could be used at present, for their present difficulty was not so much the purchasing of radium as acquiring a sufficient number of persons, medical men and assistants, who were capable of handling the substance. That matter was at present engaging the earnest attention of the Minister of Health and he hoped to be able to make some announcement on the subject.

The Vote was agreed to.

On Thursday, July 25th, on the report of a supplementary vote of £100,000 as a grant in aid of the National Radium Trust,

Mr. GREENWOOD, Minister of Health, replying to questions by Lieut.-Commander Kenworthy and Captain Bourne, said he was considering the question whether the supply of radium could be explored through the machinery of the League of Nations. The health section of the League of Nations had already had radium under its notice, and had recently published a highly technical report on the subject. On the question of the purchase of the radium; that was a matter, of course, for the Radium Trust, but the general idea was to purchase by instalments. If they went into the market to buy £250,000 worth or more of radium, obviously they might have the market put up against them, and a great deal of care would have to be taken. He imagined the procedure would be to buy in a favourable market. It was not proposed that the Commission should operate at a profit. Local hospitals would not be given the radium; it would be lent to them, but it would continue to be held legally by the Trust. It was proposed to make a small charge for the loan of the radium towards the cost of the administration of the scheme, and it was in that respect primarily that the accounts of the Commission would come before the House.

The report of the Vote was agreed to.

HOUSE OF LORDS.

WEDNESDAY, JULY 24TH.

THE CENSUS AND HOUSING CONDITIONS.

Lord BALFOUR of BURLEIGH asked the Government whether, in order to secure full information as to the existence of overcrowding, steps would be taken to distinguish in the Census of 1931 between houses of four and five rooms, and between rooms used for living and for sleeping purposes.

Lord ARNOLD (Paymaster-General) said that the whole question of the particulars to be asked for in the Census of 1931 would receive the careful and earnest consideration of the Government at an early date, with a view to seeing how far changes should be made in them so as to enlarge the general information as to the housing conditions of the people. It would be appreciated that it must inevitably be a case of balancing the demand for various information against the undesirability of overloading the Census paper. The Government recognised the importance of obtaining through the Census as complete information as possible in regard to overcrowding, and he could assure Lord Balfour of Burleigh that the particular suggestion which he had made would be very fully examined.

HOUSE OF COMMONS.

WEDNESDAY, JULY 24TH.

Injuries from Broken Glass.

Mr. DAY asked the Minister of Transport whether his attention had been drawn to the many accidents during the previous 12 months in which the public had suffered severe injuries caused by flying broken glass; and if he would consider, in conjunction with the Home Secretary, a regulation making it compulsory for all public service vehicles to be fitted with unsplinterable glass.—Mr. HERBERT MORRISON replied: I am, of course, aware that injuries have been caused in motor accidents by flying broken glass, though I am not aware that the prevalence of injuries of this nature has been marked during the past 12 months. While I am anxious to encourage the use of some form of unsplinterable glass in public service vehicles as an additional measure of safety, I am not at present satisfied that it would be practicable to make its use compulsory.

Prevention and Cure of Mental Deficiency.

Sir ROBERT GOWER asked the Minister of Health whether, having regard to the great importance to the community of the prevention and cure of mental deficiency, he would consider the desirability of appointing a Royal Commission or other suitable body to inquire into the causes of mental deficiency, its relationship to other abnormal mental conditions and social problems, and the question of its prevention and cure.—Mr. GREENWOOD replied: I will in due course give this matter the full and careful consideration which its importance demands.

International Sickness Insurance Conventions.

Mr. MANDER asked the Minister of Health whether the Government were prepared to ratify the International Labour Office Convention, 1927, concerning sickness insurance for agricultural workers; and (2) if the Government were prepared to ratify the International Labour Office Convention, 1927, concerning sickness insurance for workers in industry and mines and domestic servants —Miss BONDFIELD replied: It is the intention of the Government to ratify these Conventions when certain necessary amendments have been made in the National Health Insurance Act as affecting Northern Ireland. The Government of Northern Ireland has announced its intention to introduce the necessary legislation at the first convenient opportunity.

Village Telephone Call Offices.

Mr. KEDWARD asked the Postmaster-General if he would consider the possibility of extending the rural telephone service to the village of Newchurch, Kent, in view of the difficulty which the inhabitants experience in obtaining medical or other assistance in cases of emergency.—Mr. H. B. LEES-SMITH replied: The question of providing telephone call office facilities at the village of Newchurch is under consideration in connexion with the general proposals to establish call offices at a number of rural post offices. I hope that it will be possible to reach a decision soon.

ROYAL MEDICO-PSYCHOLOGICAL ASSOCIATION.

ANNUAL MEETING.

THE annual meeting of this Association took place in London on July 10th, 11th, and 12th, under the presidency of Dr. NATHAN RAW, C.M.G., who delivered a presidential address on

Fear.

He began by saying that fear was of immense importance to the community and of particular concern to a large number of individuals. A high authority had stated that fear was the driving force of life, without which there would be quiescence and no bodily reactions. Certainly if we had no fear our instinct of self-preservation would be useless. But an aspect which had an enormous bearing on life was a needless and morbid apprehension. The late Dr. Mercier entitled his book "Disorders of Conduct," averring that of mind he knew nothing. Dr. Raw quoted in full Mosso's classical description of his own feelings when called upon to make a speech, and added his own observations on men afflicted with stage fright when required to address their fellows. A former master of his own, who was a professor of rhetoric, at the beginning of a nervous affection could only speak sitting, owing to excessive trembling of the legs, and at last he had to renounce the triumphs of his great eloquence as he was afflicted with a temporary paralysis. The President thought the only way to find a solution of this distressing state was to analyse, without prejudice, all that was known about cerebral activity, and to see what physiologists had discovered in studying the emotions and the physical phenomena of thought.

He acknowledged that it was normal to fear; it was one of the emotional manifestations of a primal instinct and ordinarily expressed itself in efforts at flight or concealment. The Langue-James theory contended that an emotion was the sensation of the visceral changes accompanying it. There was no need of proof that visceral changes accompanied fear, pallor of skin, trembling of limbs, dilatation of pupils, protrusion of the eyes, which were said to be due to excitation of the adrenals. Reflex action played an important part in the exhibition of fear. The Langue-James theory was rejected by many great psychologists. The real solution was that fear was indicative of a defensive mechanism, that this was excited by the perception and realisation of danger, which set in motion a physical mechanism to defend life. Sherrington, by his brilliant work, showed that in animals the basal ganglia were the seat of the primary instincts and emotions. Hughlings Jackson taught that the emotion of fear arose in the cerebral cortex. Cowardice was uncontrolled fear; it was abnormal and antisocial to be a coward. The really brave man did not run away, but not because he had no fear; he overcame it and faced the danger. There was, however, a limit to human endurance, and the diabolical methods used in the late war had played havoc with the nervous systems of thousands of brave men, so that they would never recover.

Fear associated with disease was well known. Delirium tremens was not now nearly as frequent as it was 20 years ago. Edgar Allan Poe, who died of it at 37, had left a ruthless analysis of the experience. Many people lived in constant dread of such diseases as cancer, tuberculosis, blindness, or insanity.

National fear was of immense importance; whole communities might be seized with a subdued fear of attack from more powerful neighbours. The question was often asked: Is religion based on fear? It has been said that fear formed the stock-in-trade of many irrational forms of ecclesiastical propaganda. When religion, which should appeal to the highest instincts in man, debased itself to the point of appealing to the lowest and meanest instincts, it undermined the very foundations of character, poisoning the fountain of life at its source. Any religion which appealed primarily to fear was doomed to decay with the dawn of more universal intelligence. The fear of death had long been recognised as an instinct, and Rousseau said that he who pretended to face death without fear was a liar. This fear was a natural impulse, and was not merely an accident. Schopenhauer, however, said that from the point of view of intelligence there was no ground for fearing death; only those with blind faith could subdue this fear of death. The finest examples in history of the calm resignation to the inevitable were furnished by the aristocrats of France when perishing by the guillotine in the French Revolution.

The description of the human emotions given by Charles Darwin 57 years ago had never been excelled. Worry was a comparatively recent product, though fear dated from the dawn of human intelligence. No children should be brought up to fear their parents or anything else. And too many teachers seemed to think that their secondary, if not their chief, function was the creation in their pupils of inferiority complexes; certainly worry over examinations was a prolific cause of academic failure. We could never hope to conquer fear, but we should learn to control it.

Dr. REGINALD WORTH proposed a cordial vote of thanks to the President for his address, and Dr. BEDFORD PIERCE seconded.

On July 11th Dr. W. M. FORD-ROBERTSON (Northampton) read a paper entitled

Some Cases of Mental Disorder: A Patho-Clinical Study.

In recent years, he said, research into mental disorders had tended to become, more and more, the study of the pathology of the living, and to this the advances of biochemistry had largely contributed. He did not think the study of focal infection by bacteriological methods would lead very far. More effort should be made to correlate its local and remore effects in disordered hæmopoiesis, disordered metabolism, disturbed endocrines in relation to the patient's economy as a whole. It seemed that in mental disorders one had to deal with bacteria of a special type, which probably could only adapt themselves as chronic infective agents to a certain group of the community—i.e., those who had a neurotoxic susceptibility. This needed that one should search for new methods of bacteriological technique, study the results, and attempt to correlate cause and effect. Knowledge of the somatic disorders underlying insanity was, as yet, so limited that attempts to continue on these lines would lead only hesitatingly along the progressive path. Efforts should be concentrated more on the individual as a problem in pathology. There had been up to the present a lamentable lack of proper collaboration between biochemist and bacteriologist.

Dr. Ford-Robertson's main thesis consisted of a detailed account of the findings in 120 cases of mental disorder which had been thoroughly overhauled, and four of these were given with minuteness. They served, he said, to emphasise how complex, indeed elusive, were the problems of the physical disorder underlying insanity. His observations led him to believe that the person of psychotic tendencies failed to reveal clearly the underlying pathology of the internal environment by ordinary signs and symptoms. Surgical removal of foci of infection alone could not bring about recovery. Yet focal infection was of the greatest importance in mental disease. He had satisfied himself that the insane harboured anaerobic bacteria of the diphtheroid and lepto-streptothrix group which often infected the major part of the alimentary canal.

Dr. W. F. MENZIES (Cheddleton) discussed the contribution at some length, and expressed regret that the association had not provided in its rules for the admission of the pure biochemist, as he would be a great acquisition for this kind of research.

Dr. J. R. LORD (Epsom) also spoke, pointing out that it was not so much a matter of the presence of septic foci in these cases, but that the toxins were

absorbed. In the latter event a biochemical problem arose, which, if not adjusted, led to dysfunction of some part of the nervous system. Neuro-toxins seemed to have a degree of selectivity of action, different toxins selecting different functional zones.

Other Subjects Discussed.

Dr. GORDON PETERS (Epsom) read a paper on Charcot's Joints in Tabo-paresis. He related three cases of general paralysis of the insane who were also afflicted with Charcot's disease of the spine. One remarkable case was that of a woman of 29, the subject of congenital tabes who had suffered from Charcot's spine from an early age.

The morning of July 12th was taken up with a consideration of the Report of the Mental Deficiency Committee (1929), the discussion being introduced by Dr. A. F. TREDGOLD.

In the afternoon Dr. LORD spoke on a Modern Approach to the Problem of the Admission of Mental Patients to In-patient Treatment. The points he dealt with specifically were: (1) the non-intervention at any point of a judicial authority; (2) the administrative recognition of the non-volitional case; (3) the power of local authorities to deal with (and retain as necessary) occurring mental disorder on lines as far as possible parallel with those practised in regard to infectious and other physical diseases; (4) notification of all non-volitional and involuntary cases to the local authority, and the latter also to a central authority; (5) certification to be abolished and replaced by a system of confirmation or continuation of the initial action taken by the local authority, or by a panel specially nominated by the local authority; (6) all institutions receiving voluntary cases who are retained voluntarily and non-volitional cases to be registered and subject to visitation by the local authority; (7) active prophylaxis by the psychiatrisation of public assistance work.

A discussion followed.

On Wednesday the Association dined together, with the President in the chair, and the guests included Lord Riddell, the Mayor of Westminster, Dr. Pameijer, Sir Arthur Robinson, and several foreign delegates. On Thursday afternoon a reception and garden party took place at Springfield Mental Hospital.

Obituary.

KENNETH ARTHUR LEES, O.B.E., M.B., B.CHIR. CAMB., F.R.C.S. ENG.,

ASSISTANT SURGEON FOR DISEASES OF THE THROAT, NOSE AND EAR, ST. MARY'S HOSPITAL, PADDINGTON.

Kenneth Lees, who died following an operation for cerebral tumour on July 23rd at the age of 48, was the son of the famous physician David Lees, and early decided to follow his father in the study of medicine. He passed from school to King's College, Cambridge, gaining a first-class in the Natural Science Tripos in 1903. In 1905 he elected to join St. Mary's Hospital, where his father, originally a Guy's man, was giving clinical teaching to crowds of appreciative students. Though his untiring energy and keen enthusiasm, when he was working under his father's inspiration, were apparent, Kenneth Lees showed a great inclination towards surgery. He qualified M.R.C.S., L.R.C.P. in 1907, took his Cambridge degree in 1909, and became F.R.C.S. Eng. in 1912. He held a succession of resident posts at St. Mary's Hospital, and in 1914 was promoted to be surgical registrar. During the war years this post was a strenuous one. It involved full afternoons in the theatres and emergency operations, as well as much of the teaching in wards and out-patient department normally undertaken by members of the honorary staff. All those who worked with Mr. Lees during those trying times, when the staff was seriously depleted as the result of the war, testify to his unfailing promptness in answering every call, night and day, and to his equanimity and urbanity. The students who passed through the hospital during this time were indebted to him for coaching at unconventional hours, and many owe their examination success to his conscientious efforts and good-humoured ragging. His services to the hospital were recognised by the award of the O.B.E.

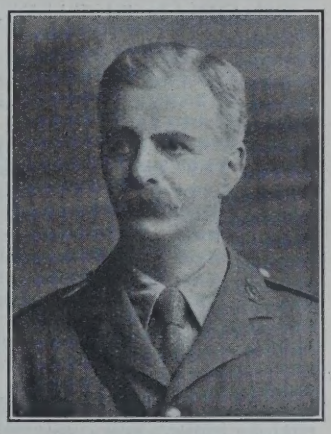
Though Mr. Lees always retained a great liking for general surgery, circumstances led him to specialise in diseases of the nose, throat, and ear; he was appointed to the staff of St. Mary's in 1919, and later to other hospitals, including the Queen's Hospital for Children, Hackney. His interest in this branch of work increased every year, and his wide surgical experience gave him from the outset a mature outlook on all aspects of a case which many specialists only acquire late in life.

Outside his work Mr. Lees had many interests. He enjoyed golf, and his car meant more to him than just a means of easy transport. He was a keen Mason and he was Worshipful Master of his hospital Lodge at the time his fatal illness manifested itself. Kenneth Lees was retiring in disposition, but in congenial company he showed a whimsical humour and keen appreciation of wit in others. He married, a few years ago, a niece of the late Dr. William Hill.

THOMAS EAGLESON GORDON, M.B., B.CH.,

PRESIDENT OF THE ROYAL COLLEGE OF SURGEONS IN IRELAND PROFESSOR OF SURGERY, TRINITY COLLEGE, DUBLIN.

THE death occurred on July 27th, at his residence in Dublin, of Prof. T. E. Gordon, President of the Royal College of Surgeons in Ireland, in the sixty-third year of his age. He had been in bad health for several months past, and had recently resigned his post as Surgeon to the Adelaide Hospital, Dublin.



PROF. T. E. GORDON.
Photo by Lafayette, Dublin

Thomas Eagleson Gordon, a North Irishman by birth, was educated at Trinity College, Dublin, doing his professional courses at the Adelaide Hospital; he graduated in 1890, and in 1895 took the Fellowship of the Royal College of Surgeons in Ireland. After holding a resident appointment at the Adelaide Hospital, he was appointed Assistant Surgeon; he had already been elected Visiting Surgeon to the City of Dublin Hospital, but resigned this post to return to the Adelaide Hospital. His professional career was bound up with this institution, for he remained in active work there for 35 years, and was senior surgeon from 1915, until ill-health forced his retirement a few months ago. In 1916 he was appointed to the chair of surgery in Trinity College in succession to the late Mr. E. H. Taylor, and during the war was attached to the 83rd (Dublin) Hospital, B.E.F., with the rank of lieutenant-colonel.

Prof. Gordon was an attractive and accomplished teacher, both in hospital and in his professorial work, while he was particularly interested in his duties as curator of the pathological museum in Trinity College, and did much to make the splendid collection of Robert Smith and Edward Bennett more readily available for teaching purposes. He was a man of wide culture, well read in history and archæology. He was elected President of the Royal College of Surgeons in Ireland last year, and in June of this year was elected for a second year. His death is greatly regretted by his professional brethren.

JOHN BROWN, M.D. MANCH., D.P.H.

FOR many years medical officer of health for Bacup, Dr. John Brown died on July 29th at Blackpool, where he had been living in retirement. He was born at Callington, in Cornwall, in 1849, and attended school there before going up to University College, London. He started the study of medicine at Charing Cross Hospital, and gained a number of scholarships and prizes in that school. On qualifying as L.R.C.P. and L.S.A. Lond. in 1877 he was appointed house surgeon to the Western Ophthalmic Hospital, and later in the same year medical officer of health for Bacup. As a post-graduate student of Owen's College he became M.B. in the Victoria University of Manchester in 1888, when he also took the diploma in sanitary science. Dr. Brown was a prolific writer, and belonged to numerous medical societies in Manchester and elsewhere. His experience in the public health service was considerable, for he undertook many branches of the work of his district. During the 15 years of retirement, which he spent in Blackpool, he devoted a good deal of attention to the subject of cancer. He leaves a widow and five sons, two of whom, Dr. J. P. Brown of Bacup, and Dr. G. B. Brown of Manchester, are members of the medical profession.

Correspondence.

"Audi alteram partem."

AURAL DISEASE AND BATHING.

To the Editor of THE LANCET.

SIR,—Though it has long been known that frequenters of swimming baths, especially deep divers, run some risk of infection of their noses, throats, and ears, the marine bathing pool, to my knowledge, has not yet been impugned. Last summer on my holiday I had the opportunity of daily observation of one such pool, which enabled me to draw certain deductions. This swimming pool had been made by enclosing a portion of the foreshore with a sea wall, the summit of which was completely submerged at every high tide. This arrangement ensured a certain amount of change in the supernatant layer or layers of water, but the bed of the pool necessarily remained undisturbed, and consequently pollutions must have slowly deposited by sedimentation, and would consist of the usual dead organic material found in swimming baths, such as human hair, material from the noses, throats, mouths, intestines, and skins of former bathers, also the remains of dead fish, crustacea, &c. To cleanse such a pool seemed to me to be an impossibility, as the bottom of the deeper portion of the pool was covered with rocks and boulders which had been enclosed when the encompassing sea wall was erected. There was one sea gate or sluice which could be opened, but this only extended to half the depth of the wall, and was consequently useless from the point of view of draining the floor of the pool.

Bathers would be wise to content themselves with the open seashore, and avoid such types of pools, though the keen swimmer would miss thereby the many gadgets, such as diving boards and slides, which render the pools so seductive.

Two cases of infected noses and accessory sinuses came under my notice from this pool, and prompted me to write this letter, as I feel that the hygienic side of such pools has often been, and may again, be overlooked in their construction.

I am, Sir, yours faithfully,

BEAUMONT H. COMERFORD, M.D., D.P.H.

Chester-square, S.W., July 30th, 1929.

To the Editor of THE LANCET.

SIR,—Your annotation on this subject last week (p. 182) has interested me, although its meritorious aloofness rather irritates me at the moment when one of my own children, as a sequel to bathing in a public swimming bath, is recovering from a mastoid operation, in spite of a prompt paracentesis of the intervening acute ear. Nor is my irritation lessened by the fact that my kind specialist colleagues seem to have no doubt of the frequency of these disasters, even in children who have perfectly healthy throats.

If your suggestion is true that in the purification of bathing places "more attention has been paid, as evidence of contamination, to the intestimal flora of the *Bacillus coli* group, than to the pyogenic organisms which more frequently attack the ears," it would seem that the supervision of these places is conducted on lines ten years out of date, and that it is necessary to impress the public health authorities with the great importance of the post-war streptococcus. Further, it would be interesting to know if any special measures are undertaken to prevent excessive contamination of swimming baths in times of great heat and shortage of water.

I am, Sir, yours faithfully,

August 28th, 1929. F.R.C.P.

AN INHERITED TENDENCY TO SUPERNUMERARY DIGITS.

To the Editor of THE LANCET.

SIR,—The following example of heredity in the appearance of supernumerary digits seems to be of interest.

My wife, who has perfectly normal hands and feet (as also have I), gave birth three months ago to a female child which had an extra thumb on each hand and an extra great toe, webbed with the normal on the left foot. My wife's sister was born with an extra thumb on her right hand. One other brother and a sister had normal hands. My father-in-law, his brother and his sister all had a normal number of digits, but the thumbs in all cases were long and tapering, look more like index-fingers and have not the full range of movement of the normal thumb. His mother and her brothers and sisters all, so my information goes, had precisely the same abnormally shaped thumbs, but had no "extras." Going back one further generation, my wife's great-grandmother had extra thumbs on both hands. I do not know if she had any abnormality of the feet.

Apparently, therefore, the inherited tendency passed over two generations, only showing itself as a slight deviation in all cases from the normal in the shape of the thumbs; affected the next in *one* individual only; and was passed down to yet another in an indirect fashion.

I should be glad to have the comments of an expert in Mendelism on this sequence and for a forecast as to the prospects of future individuals exhibiting the characteristic.

For obvious reasons I prefer to sign myself

Yours faithfully,

July 29th, 1929. PHALANX.

VICTORIA INFIRMARY, NEWCASTLE-ON-TYNE.—The report for 1928 shows that 14,469 in-patients, whose average stay was 15·1 days, were treated. The accident cases totalled 20,657, of which 1301 were motor casualties; 436 of them were admitted to the wards. The number of beds available, including 30 at the Innes Hopkin's Memorial Home at Ryton, is 572, but every day in the year the normal number of beds has been exceeded by 28, and on some occasions 80 more beds have been occupied than the number for which the wards were planned. The nurses' home is to be extended by 150 bedrooms, 100 nurses being at present housed elsewhere. The medical staff are pressing for the establishment of a number of paying beds in the infirmary extension vacated by the Ministry of Pensions.

Medical News.

ROYAL COLLEGE OF PHYSICIANS OF LONDON.—At an ordinary meeting of the College, held on July 25th, with Sir John Rose Bradford, the President, in the chair, the following officers of the College and members of committees were elected for the ensuing year :—

Censors : Dr. Robert Hutchison, Dr. James Collier, Dr. R. A. Young, and Dr. Cecil Bosanquet. *Treasurer :* Dr. S. P. Phillips. *Registrar :* Dr. Raymond Crawfurd. *Harveian Librarian :* Dr. Arnold Chaplin. *Assistant Registrar :* Dr. R. O. Moon. *Library Committee :* Dr. H. R. Spencer, Dr. R. T. Williamson, Dr. Hector Cameron, and Dr. C. J. Singer. *Curators of the Museum :* Dr. H. R. Spencer, Dr. C. E. Lakin, Dr. Hugh Thursfield, and Dr. C. F. T. East. *Finance Committee :* Dr. H. Morley Fletcher, Sir John Broadbent, and Dr. L. S. T. Burrell.

The following were appointed examiners :—

Chemistry: Mr. H. W. Cremer and Mr. W. B. Tuck, D.Sc. *Physics:* Mr. J. H. Brinkworth and Mr. D. Orson Wood. *Practical Pharmacy :* Dr. W. J. Adie, Prof. W. E. Dixon, Dr. Philip Hamill, Dr. Newman Neild, and Dr. V. J. Woolley. *Physiology :* Prof. B. J. Collingwood and Prof. Swale Vincent. *Pathology :* Sir Frederick Andrewes and Dr. Charles Bolton. *Anatomy :* Prof. Duncan Blair. *Medical Anatomy and Principles and Practice of Medicine :* Sir Percival Hartley, Dr. W. J. Fenton, Dr. A. E. Russell, Dr. Cecil Wall, Prof. Frederick Langmead, Dr. E. A. Cockayne, Dr. E. P. Poulton, Dr. D. H. de Souza, Dr. Albert Ramsbottom, Dr. A. C. D. Firth, Dr. F. M. R. Walshe, and Dr. E. Bellingham Smith. *Midwifery and Diseases peculiar to Women :* Dr. Eardley Holland, Dr. J. B. Bannister, Dr. Carlton Oldfield, Dr. Malcolm Donaldson, and Mr. A. C. Palmer. *Public Health :* (Part I.) Dr. Roche Lynch and (Part II.) Dr. Charles Porter. *Tropical Medicine :* Prof. J. C. G. Ledingham and Dr. Harold Scott. *Ophthalmic Medicine and Surgery :* Dr. Grainger Stewart. *Psychological Medicine :* (Part I.) Dr. Edward Mapother. (Part II.) Dr. Porter Phillips and Dr. Gordon Holmes. *Laryngology and Otology :* Dr. Donald Rose Paterson. *Murchison Scholarship (1930) :* Dr. Gordon Holmes and Dr. Letheby Tidy.

Dr. Letheby Tidy was elected representative of the College on the General Medical Council in succession to Sir Farquhar Buzzard, and Sir Ewen Maclean a representative on the Advisory Medical Board of the University of Wales.

The Baly medal for distinction in the science of physiology was awarded to Dr. E. D. Adrian, F.R.S., and the Bisset-Hawkins medal for advancing sanitary science and public health to Prof. Edward Mellanby, F.R.S. The Murchison Scholarship was awarded to Ian G. W. Hill, M.B., of Edinburgh University. Prof. J. B. Leathes, F.R.S., was appointed to deliver the Harveian oration, and Prof. W. E. Hume the Bradshaw lecture in 1930. Sir Maurice Craig was appointed a delegate to the Conference of the National Council of Mental Hygiene to be held in October, and Dr. Maurice Davidson a delegate to the Fifteenth Annual Conference of the National Association for the Prevention of Tuberculosis at Newcastle-upon-Tyne in October.

The following further appointments were announced : Dr. Andrew Balfour as FitzPatrick lecturer for 1930 ; Dr. Carey Coombs as Lumleian lecturer for 1930 ; Dr. Donald Hunter as Goulstonian lecturer for 1930 ; Prof. J. J. R. Macleod, F.R.S., as Oliver-Sharpey lecturer for 1930 ; Dr. L. S. T. Burrell as Mitchell lecturer for 1930 ; and Prof. Matthew J. Stewart as Croonian lecturer for 1931.

The thanks of the College were voted to Sir Wilmot Herringham and Dr. John Fawcett for their valuable and lengthy services as representatives of the College on the Senate of the University of London.

The President nominated a committee for the preparation of a new edition of the official "Nomenclature of Diseases."

Having satisfied the Censor's Board the following were admitted Members :—

William W. Barraclough, Richard A. Brews, James K. Cameron, Geoffrey P. Chandler, Albert Coleman, Frederick M. M. Eyton-Jones, Kenneth A. Gilchrist, Frederick C. Golding, John S. Harris, Jack Hartsilver, Aubrey J. Lewis, George E. Lewis, Charles W. Mackenzie, William F. T. McMath, Natwar Jaising Modi, Francis J. Niall, Douglas A. Robertson, Raghunath Saran, Cedric W. Shaw, Gordon M. Tallent, and Geoffrey T. Todd.

At the same meeting of the Comitia licences to practise were granted to 149 candidates (133 men and 16 women) who have passed the final examination of the Conjoint Board in Medicine, Surgery, and Midwifery, and have complied with the by-laws of the College. The following are the names and medical schools of the successful candidates :—

C. Abraham, Univ. Coll. ; S. Annaswami, Madras ; M. A. E. Anous, Cairo and King's Coll. ; S. W. K. Arundell, Middlesex ; Nancy M. Badeley, Royal Free ; C. P. Bailey, Cambridge and St. George's ; E. F. Barnardo, Cardiff and London ; D. W. Bawtree, Cambridge and St. Thomas's ; D. R. Belletty, Calcutta and Middlesex ; M. J. Bennett-Jones, Liverpool ; H. J. W. Bergh, St. George's ; W. R. Bett, St. Bart.'s ; P. M. F. Bishop, Oxford and Guy's ; R. M. Bolam, Cambridge and Durham ; J. J. Boulle, London ; J. H. Boultbee, Liverpool ; K. J. Box, St. Thomas's ; Bertha A. Briant, Royal Free ; C. E. Brierley, Cardiff and Bristol ; H. P. Brody, Sheffield ; E. A. Butterworth, St. Mary's ; V. I. C. Cadogan, Univ. Coll. ; E. H. Capel, Middlesex ; F. S. Cliff, Univ. Coll. ; F. T. Clive, St. Thomas's ; C. L. Collins, Cambridge and St. George's ; P. A. Cooper, Univ. Coll. ; W. J. Cotton, Oxford and Guy's ; J. F. Crabtree, Manchester ; S. T. Crowther, Cardiff ; P. Dalzell, St. Bart.'s ; A. C. Dawes, King's Coll. ; Catherine Day, Royal Free ; Jessie E. Dodds, Sheffield ; C. E. Dolman, St. Mary's ; W. J. L. Downing, Middlesex ; G. Duckworth, St. George's ; T. F. H. Duffell, Birmingham ; D. H. A. Edmondson, Liverpool ; L. M. Edwards, Cardiff and St. Bart.'s ; J. L. Egan, King's Coll. ; Cordelia H. England, Cambridge and King's Coll. ; I. Q. Evans, Cardiff and St. Bart.'s ; M. D. A. Evans, Cardiff and Univ. Coll. ; R. G. P. Evans, Middlesex ; D. Ezekiel, Charing Cross ; R. B. H. Faichney, Liverpool ; M. Farid, Birmingham ; W. J. Ferguson, Guy's ; J. A. Fernandez, Univ. Coll. ; K. S. Fitch, Guy's ; S. K. Foster, Leeds ; W. W. Fox, Manchester ; A. W. Franklin, St. Bart.'s ; A. Freitag, Cracow and Charing Cross ; R. L. Frost, Guy's ; Ruth C. Galletly, Royal Free ; S. Gasson, St. Bart.'s ; N. D. Gerrish and J. J. J. Giraldi, Bristol ; Elizabeth L. Haden, Univ. Coll. ; Hafizuddin, Agra and Charing Cross ; Nellie M. E. Hallinan, Charing Cross ; Margaret L. Hamburger, Royal Free ; A. G. J. Harris, Cambridge and St. Bart.'s ; R. L. H. Harris, St. Bart.'s ; F. Hawking, Oxford and St. Bart.'s ; Dora M. Hill, Charing Cross ; R. E. Holmes, London ; I. P. G. Howells, Cardiff and St. Mary's ; W. V. Howells, Cambridge and London ; J. M. Hulett, Guy's ; Laura F. Hutton, Charing Cross ; D. E. Hyman, Manchester and Charing Cross ; K. G. W. James, King's Coll. ; S. K. Jatar, Bombay and London ; A. N. Jones, Guy's ; D. S. Jones, St. Bart.'s ; H. H. Kenshole, Cardiff and Guy's ; T. H. Khan, Calcutta and King's Coll. ; C. W. Kidson, Birmingham ; S. Knight, Univ. Coll. ; M. Kokia, Westminster ; M. Kremer, Middlesex ; J. Libman, Liverpool ; F. J. G. Lishman, Univ. Coll ; M. Luckeenarain, Univ. Coll. ; S. D. McClean, Guy's ; W. H. McMenemey, Oxford and St. Bart.'s ; A. H. M. McMullan, Birmingham ; R. G. Mayer, Bristol ; R. B. Mayfield, Cambridge and St. Thomas's ; D. A. Metcalf, Cambridge and London ; V. L. Misso, King's Coll. ; S. N. Mistri, Bombay and London ; W. J. Moffat, Cambridge and St. Thomas's ; A. B. Moffatt, Manchester ; G. B. Mohile, Bombay and Guy's ; R. D. Morgan, Cardiff and Middlesex ; Q. St. L. Myles, Oxford and St. Thomas's ; T. Nallainathan, Ceylon and Univ. Coll. ; R. A. Nash, Guy's ; E. J. Neill, St. Bart.'s ; P. L. Nirula, Punjab ; F. E. Norris, London ; S. W. K. Norris, Birmingham ; L. J. O'Loughlin, Manchester ; H. J. Partington, Liverpool ; Penelope A. Peach, Royal Free ; W. Pearce, Leeds ; A. L. Pereira, St. George's ; R. B. Pringle, Cambridge and St. Thomas's ; G. E. A. Prins, Calcutta and St. Mary's ; C. B. Prowse and W. Radcliffe, Cambridge and St. Bart.'s ; B. Rait-Smith, St. Bart.'s ; Florence Ram, Sheffield and Cambridge ; B. V. P. Reddy, Bombay and London ; W. H. Reynolds, Cardiff ; P. J. Richards, Cambridge and St. Bart.'s ; K. M. Robertson, St. Thomas's ; J. A. Robson, St. Bart.'s ; Irene H. Rogers, King's Coll. ; H. L. Rogerson, St. Bart.'s ; I. A. Sabri, Cairo and St. Bart.'s ; R. M. Sargent, Univ. Coll. ; C. K. Sconce, Liverpool ; J. M. Scott, St. Bart.'s ; R. P. W. Shackleton, Cambridge and St. George's ; Everell M. Shipham, Royal Free ; S. Simon, Leeds ; A. R. Smith, St. Thomas's ; W. H. B. Spoor, Cambridge and Bristol ; L. Stirling, London ; A. G. C. Taylor, St. Thomas's ; E. W. Thompson, Manchester ; D. J. Turnbull, London ; J. O. B. van Langenberg, Ceylon and Middlesex ; M. H. Wace, St. George's ; J. V. Walker, Birmingham ; R. Warnecke, Adelaide and London ; J. A. White, St. Mary's ; J. O. Williams, St. Bart.'s ; J. K. Willson-Pepper, Cambridge and St. Thomas's ; Camille Wiseham, Royal Free ; M. G. Woolff, Cape and St. Thomas's ; L. C. Wright, Manchester ; P. Yarmarko, Manitoba and Middlesex ; and D. J. Young, Middlesex.

The undermentioned diplomas were conferred (jointly with the Royal College of Surgeons) upon the following candidates :—

Diploma in Public Health.—K. P. Anklesaria, D. D. Bhargava D. L. Brown, H. A. Bulman, Helen Bumstead, K. Cathiravelu, K. B. Chakravarti, A. N. Chatterji, M. Das, A. W. H. Donaldson, D. C. Farquharson, Loveday S. Farquharson, J. W. Fisher, L. Fourie, Hilda M. Garlick, D. Hughes, A. T. Jones, Margaret M. McDowall, Aileen I. McMahon, A. Macmillan, H. H. Mahmood, A. J. Mhatre, S. Mozumder, Joan Nixon, J. D. Robertson, A. S. Simpson, G. Singh, W. S. Slater, J. H. Stritch, R. Watson, Edith S. Williamson, and Frances M. Yule.

Diploma in Ophthalmic Medicine and Surgery.—Agnes L. Adam, B. Alexander, P. K. Banerjea, W. A. Briggs, R. D. W. Butler, S. N. Cooper, V. A. P. Costobadie, T. Edmunds, Julia M. Fleming, A. A. Gibbons, S. L. Geerin, I. C. Fraser, J. R. McClean, N. Manson, R. S. Marya, M. D. Nunan, P. Pattabhiramaiya, A. M. Ponnambalam, C. S. V. Ramanan, K. Sen, L. B. Somerville-Large, B. R. Tandan, M. Tree, T. K. Uttam Singh, D. G. Vyas, and G. B. White.

Diploma in Psychological Medicine.—Leonard Barber, Flora H. M. Calder, Viola C. Cameron, Ruby T. Carr, S. W.

Davies, J. H. Ewen, E. A. Haslam-Fox, J. E. S. Lloyd, Seringapatam V. S. Rao, and Kathleen M. Todd.

Diploma in Laryngology and Otology.—Bodh Raj. Chaudhri, Patrick Hickey, G. J. Hutchison, Rajnarain Kacker, W. A. Kerr, K. S. May, R. F. Paterson, C. L. Rosenfield, and Gobind Vaishnavi.

ROYAL COLLEGE OF SURGEONS OF EDINBURGH.—At a meeting of the College on July 23rd, with Mr. Alexander Miles, the President, in the chair, the following 27 successful candidates (out of 81 entered) who passed the requisite examinations between March 21st and 28th were admitted Fellows :—

George Brown, Eva Taylor Cairns, John Campbell, Kewal Ram Chaudhri, Douglas Bannerman Craig, Ross Alfred Grant, Guthrie Yochlee Graves, Thomas Paterson Gill, David Hardie, Arthur Taylor Henry, Reginald Stuart Jones, Ganesh Das Kapur, John Kerr Ritchie Landells, Donald Percy McDonald, George Henry Mohony, Ma Yin May, Andrew Patrick, William Valentine Semple, William Stewart Shearer, Balwant Singh, Narain Singh, William Collis Spackman, Robert Scott Stevenson, George Munro Sturrock, Alan Boardman Taylor, Maxwell Kidger Tucker, and George Sydney Thompson

Dr. Hari Prakash Lal obtained the diploma of Licentiate of the College.

The Ivison Macadam Memorial Prize has been awarded after a competitive examination in Organic Chemistry to Mr. C. D. Campbell.

UNIVERSITY OF GLASGOW.—It is announced that Sir Donald MacAlister will retire in October from the offices of Principal and Vice-Chancellor of the University.

UNIVERSITY OF LEEDS.—On July 23rd the honorary degree of D.Sc. was conferred on Dr. C. H. Mayo of Rochester, Minnesota.

ST. MARY'S HOSPITAL.—Lord Iveagh has promised to give £20,000 towards the extension of the St. Mary's Hospital Therapeutic Inoculation Department which is under the direction of Sir Almroth Wright, F.R.S. This sum will be paid in seven annual instalments and the hospital will thus be able to claim income tax and surtax so that over £30,000 will be available for the building of a pathological institute beside the hospital.

WALLINGFORD DISTRICT HOSPITAL.—The Morrell Memorial Hospital, so named after Miss Mary Morrell, the founder in 1879 of Wallingford Cottage Hospital, a nurse who died from septic poisoning contracted in her work, was last week superseded by a new District Hospital. The building contains 18 beds in three wards, and two private wards, and is equipped with modern appliances.

Dr. Arthur Edward Giles, consulting surgeon to the Chelsea Hospital for Women and gynæcologist to the Prince of Wales General Hospital, Tottenham, has been elected Master of the Drapers Company. He is the first member of the medical profession to fill the office of Master of this Company, whose records go back to the fourteenth century.

DONATIONS AND BEQUESTS.—The late Mr. Frederick Dempster-Smith, of London and Bournemouth left £25,000 to the Governors of St. Bartholomew's Hospital for the endowment of a ward in memory of his late friend William James Marriage ("Sol"), a corporal-major in the Household Battalion, who was killed in France, to be called the Sol Memorial Ward.—Mr. George Turner of Edgbaston, Birmingham, left £1,250 to the Birmingham General Hospital, and £1,000 each to the West Bromwich District Hospital, Royal Midland Counties Hospital for Incurables, Leamington, and the Quest Hospital, Dudley.—Mr. Elias Sumner Berry of Southport left £1000 to the Preston and County of Lancaster Queen Victoria Royal Infirmary to name an "Oswald William Berry Bed" in memory of his son who was killed in action in France.—Mr. Alfred Thomas Johnson Ward of Brislington, Bristol, left £500 each to Bristol Royal Infirmary, Bristol General Hospital, Bristol Eye Hospital, and the Royal School of Industry for the Blind, Westbury-on-Trim.—Lady (Elizabeth Ann Phippen) Esme Gordon of Princes-gardens, London, left £400 to St. George's Hospital, £300 to Britsol Infirmary, £250 each to the London Hospital, Queen Mary's Hospital, Roehampton, S.W., St. Dunstan's Hostel for Blinded Sailors and Soldiers, National Society for the Prevention of Cruelty to Children, and Our Dumb Friends' League. After legacies to servants and others, the testatrix left the residue of her property equally between St. Bartholomew's Hospital, St. Thomas's Hospital, Middlesex Hospital, Cancer Hospital, Fulham-road, the Hospital for Sick Children, Gt. Ormond-street, the National Institute for the Blind, and the Distressed Gentlefolks' Aid Association.—Mr. Alfred Norman Disney of Wimbledon, left £1000 to the building extension fund of the Nelson Hospital, Merton.

CHARING CROSS HOSPITAL NURSES' HOSTEL.—St. Mary's Convent, Haverstock Hill, has been purchased b Charing Cross Hospital as the site of a new nurses' hoste The spot is easy of access from the hospital by the Hampstea Tube.

LONDON HOSPITAL SUNDAY FUND.—The Council o this Fund reports that the amount received in the past yea was £78,130, being £3300 less than in the previous yea Of this sum £77,949 is to be distributed among 165 hospitals 32 dispensaries, and 35 nursing associations.

EAST HAM WAR MEMORIAL HOSPITAL. — O Wednesday in last week the Queen opened this genera hospital, which is a memorial to 2000 local men who fell i the war. Its genesis was the East Ham Cottage Hospita founded in 1902 with 25 beds, which has now been converte into children's wards. The new building contains 100 bed and has cost £75,000.

HOSPITAL OF ST. JOHN AND ST. ELIZABETH.—Thi hospital in Grove End-road, St. John's Wood, which wa founded in 1856 by four of the Sisters of Mercy who had bee working with Miss Florence Nightingale, last year treate 1542 in-patients—an increase of 177 over the preceding yea —of whom 321 were private patients. There were 113 operations, the X ray department has been enlarged, an the rebuilding of the first portion of the nurses' home i approaching completion. The second portion is urgentl needed, the old building being in bad structural condition The hospital contains six wards and there are 18 rooms fo private patients, including two for persons of small means for which the charge is £2 10*s.* per week. Eight rooms moreover, are reserved for priests and nuns of the Roma Catholic diocese of Westminster, but the hospital is entirel undenominational. The total weekly cost per patient £4 6*s.* and of the £25,526 spent during the year only £283 was derived from investments. There are 134 beds and th hospital is a training school for radiographers and fo Roman Catholic nurses.

NATIONAL ASSOCIATION FOR THE PREVENTION O TUBERCULOSIS.—At the annual meeting last week the Counc reported that the special appeal for £100,000 had produce £110,941. From this money grants have been made to th Burrow Hill Sanatorium Colony, at Frimley, and towar the establishment of workshops for tuberculous patient The Burrow Hill Colony is an experimental scheme fo providing treatment and technical education for tuberculou boys from 14 to 19 years old under medical and scholast supervision (see THE LANCET, 1929, i., 673). It contain 80 beds, 60 of which are provided for arrested cases ; th other 20 are in a separate block for patients in the earli stages of the disease. The institution is primarily intende for youths suffering from pulmonary tuberculosis in who permanent arrest of the disease is ultimately likely to secured, and who are in need of, and temperamentally fitt for, technical education, which consists of gardening a clerical work. For the rest, four medical men have be engaged as Medical and Assistant Medical Commissione who, in addition to general propaganda work, act as lecture Three motor vans, with interesting exhibits, including film have been equipped, and illustrated lectures have been giv in many parts of England and Scotland. The educatio work is organised by Dr. William Brand, the Medi Commissioner.

CHADWICK TRUST SCHOLARSHIPS.—In view of t quality and number of the applications received for the t Chadwick travelling scholarships in sanitary science a municipal engineering, the trustees have decided to ma three instead of two appointments.

The scholarships are of £400, tenable for one year, and t successful candidates are : Francis Bach, M.D. Oxf., O Patient Medical Officer of the National Heart Hospital, whom a scholarship is granted "for the purpose of inves gating the environmental and other causes of rheuma diseases and their influence in producing diseases of heart" ; Edmund A. Elsby, B.Sc., of Liverpool Universi who will study and collect data respecting the removal silica dust from the atmosphere in factories ; and John Dempster, B.Sc., Glasgow University, who will study sew and sewerage with special regard to trade waste.

The Bossom Gift Scholarship of £100, to enable holder to make a specialised study and present a sche showing the most complete and efficient system of heat and ventilation adaptable to a hall seating about 1 people, with smaller rooms attached and a set of residen quarters in the same building, is offered for competit Candidates, who must be British subjects, should apply proper form between August 26th and Sept. 30th to clerk of the Chadwick Trustees, at 204, Abbey House, W minster.

ENLARGEMENT OF BOSCOMBE HOSPITAL.—Four new wards for men, containing a total of 12 beds, were opened last week at the Boscombe branch of the Royal Victoria and West Hants Hospital. The largest ward, of six beds, is named after the late Mr. Augustus Gould, one of the benefactors of the Hospital.

A NURSERY SCHOOL IN LIVERPOOL.—The Liverpool Education Committee have approved a resolution by the Elementary Schools sub-committee recommending the City Council to authorise the establishment of an experimental nursery school to accommodate about 200 children between the ages of 2 and 5 years. The aims of the school are stated to be: (*a*) To foster all-round healthy physical development by providing a favourable environment, by training in hygienic habits, and by encouraging free activity; (*b*) to lay the foundations of intellectual development by providing a great variety of interesting experiences, by special training, and by such simple instruction as is suitable; and (*c*) to lay the foundations of character by the inculcation of self-respect and consideration for others. Formal lessons will have no place in the curriculum. The children will be taken daily to and from their homes. The cost to the ratepayers will be about £17 per head per annum, which is less than half the expense of children at Corporation day nurseries.

SUN-BATHING IN PUBLIC PARKS.—On July 29th Mr. George Lansbury, the First Commissioner of Works, received a deputation including Dr. C. W. Saleeby, Sir Arbuthnot Lane and Sir Alfred Fripp, which put forward, pleas for extended facilities for sun-bathing in public parks. Sir Richard Paget outlined a scheme for a permanent sun-bathing colonnade on the west bank of the Serpentine in Hyde Park, and appealed to the Department to encourage the granting of permission all over the country for the wearing of bathing shorts. In his reply, Mr. Lansbury referred to the fundamental need for providing more sunlight in the homes of the people, and spoke of the care which was taken to see that those in mental homes and prisons should get plenty of light and air. Similar regulations were made for children in class rooms. The only time when the law did not insist on the proper cubic space was when the children were asleep, which seemed to him one of the maddest things in the world. He hoped that legislation to be introduced in the autumn would deal with the slum problem so drastically that no child could in future be born in an underground basement.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

ALL SAINTS' HOSPITAL, Vauxhall Bridge-road, S.W. Special Course in Urology. Afternoons and evenings until the end of August. Further information from the Secretary, Fellowship of Medicine.

Appointments.

GREGORY, J. C., L.R.C.P. Lond., M.R.C.S., has been appointed Obstetric House Surgeon at University College Hospital.

Certifying Surgeons under the Factory and Workshop Acts: HENDRON, M. F., M.B., Ch.B. Belf. (Croston, Lancs.); and MOWAT, J., M.B., Ch.B. Glasg. (Chapel-en-le-Firth, Derby).

Vacancies.

For further information refer to the advertisement columns.

Aylesford, British Legion Village, Preston Hall Sanatorium.—Second Asst. M.O. £200.
Barnsley, Beckett Hospital and Dispensary.—H.P. £140.
Barrow-in-Furness, North Lonsdale Hospital.—H.S. £150.
Basingstoke, Park Prewett Mental Hospital.—Jun. Asst. M.O. £350.
Birkenhead General Hospital.—Cas. S. £100.
Bradford, Royal Eye and Ear Hospital.—Jun. H.S. £120.
Brighton, Royal Sussex County Hospital.—H.S. £150.
Burton-on-Trent, General Infirmary.—2nd Res. H.S. £150.
Bury Infirmary.—Sen. H.S. 2nd H.S. Also 3rd H.S. At rate of £200, £175, and £150 respectively.
Cardiff Royal Infirmary.—Aural H.S. At rate of £75.
Carlisle, Cumberland Infirmary.—H.P. Also H.S. to special Departments. Each at rate of £155.
Cheshire Joint Sanatorium, Market Drayton, Salop.—H.P. £250.
Colonial Medical Services.—Vacancies.
Dudley, Guest Hospital and Eye Infirmary.—H.S. £150–£175.
East Ham Memorial Hospital, Shrewsbury-road, E.—Res. M.O. At rate of £150.
Exeter, Royal Devon and Exeter Hospital.—Asst. H.S. At rate of £100.
Glasgow, Govan District Asylum.—Jun. Asst. M.O. £325.
Great Yarmouth General Hospital.—Sen. H.S. £150.
Ilford Emergency Hospital.—Sen. and Jun. H.S.'s.
Infants Hospital, Vincent-square, Westminster.—Anæsthetist.
Ipswich, East Suffolk and Ipswich Hospital.—H.S. At rate of £120.
Kidderminster and District General Hospital.—H.S. At rate of £150.
Liverpool, Ministry of Pensions Hospital for Epileptics, Maghull.—Jun. M.O. £300.
Liverpool Open Air Hospital for Children, Leasowe.—Jun. Res. M.O. At rate of £200.
Liverpool, Royal Liverpool Children's Hospital.—Res. M.O. for Heswall Branch. At rate of £120. Also 2 Res. H.P.'s and 2 Res. H.S.'s for City Branch, Myrtle-street. Each at rate of £60.
London Female Lock Hospital, 283, Harrow-road, W.—H.S. At rate of £150.
London Homœopathic Hospital, Great Ormond-street, W.C.—Asst. Surgeon for Diseases of the Eye.
Lowestoft and North Suffolk Hospital.—H.S. £120.
Manchester, Ancoats Hospital.—Orthopædic H.S. Also H.P. Each at rate of £100.
Manchester Royal Infirmary.—Jun. H.S. £100.
Middlesex Hospital Medical School, W.—Second Demonstrator in Physiology. £250.
Miller General Hospital, Greenwich-road, S.E.—Hon. P. to Skin Dept. Also Cas. O. At rate of £150.
Northwood Mount Vernon Hospital.—H.S. At rate of £40.
Nottingham General Hospital.—Asst. Res. Cas. O. At rate of £150.
Nottingham Children's Hospital.—Res. H.S. At rate of £150.
Oldham County Borough Education Committee.—Asst. Schools M.O. £600.
Richmond Royal Hospital.—Jun. H.S. £100.
Rotherham, County Borough of.—Deputy M.O.H., &c. £650.
Rotherham Hospital.—H.P. £180.
Royal Air Force Medical Service.—M.O.'s.
Salisbury General Infirmary.—Res. H.P. £150.
Scarborough Hospital and Dispensary.—Two H.S.'s Each at rate of £126.
Shipley, Urban District of.—M.O.H. £800.
Swansea Hospital.—H.S. £150.
Weston-super-Mare, Queen Alexandra Memorial Hospital.—Res. M.O. £130.
West Riding of Yorkshire.—County M.O.H. £1,600.
Woolwich and District War Memorial Hospital, Shooters' Hill, S.E.—Jun. H.S. At rate of £125.
Worcester General Hospital.—Sen. and Jun. Res. M.O.'s. £180 and £120, respectively.

The Chief Inspector of Factories announces vacant appointments for Certifying Factory Surgeons at Bristol (Glos.), and Brentford and Ealing. (Middlesex).

Births, Marriages, and Deaths

BIRTHS.

BATTEN.—On July 27th, at a nursing home, Hampstead, the wife of Lindsey W. Batten, M.B., M.R.C.P., of a son.

HEGGART.—On July 18th, at Victoria Cottage, Rowhedge, Colchester, the wife of Dr. John E. Heggart, of a son.

DEATHS.

BOTT.—On July 21st, at The Bungalow, Percy road, Broadstairs, Stanley Bott, M.D., L.R.C.P., M.R.C.S., aged 50, late of Tower House, Caistor, Lincs.

GRAVELY.—On July 24th, at Cowfold, William Homewood Gravely, M.R.C.S., L.R.C.P.

LEES.—On July 23rd, Kenneth Arthur Lees, F.R.C.S., formerly of Weymouth-street, W.

LUCAS.—On July 23rd, Thomas John Rashleigh Lucas, C.B., colonel (retired), A.M.S., late of Bury-street, St. James's, S.W., son of the late George Lucas, of Ballinadee, Co. Cork, Ireland, aged 71.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

INDEX TO "THE LANCET," VOL. I., 1929.

THE Index and Title-page to Vol. I., 1929, which was completed with the issue of June 29th, is now ready. A copy will be sent gratis to subscribers on receipt of a post-card addressed to the Manager of THE LANCET, 1, Bedford-street, Strand, W.C. 2. Subscribers who have not already indicated their desire to receive Indexes regularly as published should do so now.

Notes, Comments, and Abstracts.

FOUR MILLENNIUMS OF CHINESE MEDICINE.

By K. C. WONG.

(*Concluded from p. 208.*)

IV. The Modern or Transitional Period.

Transitional is a fitting term for the Tsing Dynasty, for during this period Chinese medicine showed a gradual and perceptible decline until 1805, when it received a fresh shock by the introduction of Western Medicine. Struggling under the yoke of an alien race naturally, the scientific advancements made could not be compared with those made in other Dynasties. Emperor Kien Lung, however, was a great patron of literature, and as an outcome of his encouragement the "Golden Mirror of Medicine" was produced. This is a sort of encyclopædia of medicine and surgery compiled by a committe of doctors at the order of the Emperor. It summarises the corrections and revisions of many ancient works and epitomises all the recent methods and discoveries. The "Golden Mirror" is recognised as a standard work.

An interesting figure of this time was Wang Hsun-shan, who is sometimes styled the reformer of Chinese medicine. He was the author of "Correction of Medical Errors," a remarkable little work which contains many ingenious opinions concerning anatomy and pathology, based on 42 years medical experience, and the observations of 30 decapitated human bodies. Unfortunately the corrections are erroneous. The book, though of not much scientific value, is full of original ideas, the opinions on the causation of hemiplegia, and on the brain as the organ of thought, being especially interesting.

Vaccination.—The Western method of vaccination was introduced into China in May, 1806. It was brought over from the Philippines to Macao, whence it spread to Canton and other places. It is remarkable that a century before Jenner's epoch-making discovery the Chinese seem to have had an idea of vaccination, for in the "Synopsis of Ancient Herbals" the use of fleas from the cow for the prevention of small-pox is mentioned—is it wholly impossible that the fleas of a cow affected with variola, when taken by the mouth, might have an effect analogous to that of vaccination? That this treatment was once popular suggests that there may be some efficacy in it; if so, and if there had been a Chinese Jenner to follow up the clues millions of lives might have been saved.

Western Medicine.

In 1805 Dr. Hobson, an Englishman, came to Canton to be followed later by Drs. Parker, Kerr, and others. Silently and steadily these pioneers of Western medicine worked their way, and in spite of the proverbial conservatism of the people it has now gained a firm foothold. Only a few historical landmarks will be given.

The first Chinese who studied foreign medicine abroad was Wong Cheuk Hing. A native of Canton he was born in 1832, and obtained his English education in Macao and Hong-Kong. In 1840 he followed a Mr. Brown to America for further studies where he stayed for four years. After his graduation in literature he went over to Edinburgh to study medicine, receiving his degree in 1855. Two years later he returned to China and worked in the various hospitals in Hong-Kong and Canton until his death in 1878. With the return of a number of graduates from Japan in 1899 a new situation was created. Hitherto all Western medical work was entirely in the hands of European and American doctors. Through the writings and influence of this new body of men, Japanese medicine, and especially Japanese medical terms, became popular. They founded schools and hospitals and gradually developed into a new force in Chinese medical matters. Many of them are now holding important positions in the Government.

The new era in modern preventive medicine may be said to have dated from 1911. The great pneumonic plague in Manchuria demonstrated to the people the superiority of Western science as compared with the old native methods for the suppression of plague. Since that time many laws governing the notification of infectious diseases, the standardisation of medical education, the dissection of dead bodies, the registration of medical practitioners, the sale of narcotic drugs, &c., have been passed. In 1914 the National Medical Association of China, which has for its members the most prominent graduates from European, American, Japanese, and Chinese Colleges, was founded. Prior to this teachers and authors had great difficulty in their work because of the lack of uniform scientific terms. In 1915 a Terminology Committee was appointed, consisting of representatives of the Ministry of Education, National Medical Association, Medical and Pharmaceutical Society, Medical Missionary Association, and Kiangsu Educational Association, to determine the terms to be used throughout China. In order to promote public health and sanitation among the masses a joint Council of Public Health Education was formed in 1916 consisting of representatives from the National Medical Association, Medical Missionary Association, Y.M.C.A., Y.W.C.A., and China Christian Educational Association. All these organisations are doing splendid work towards the medical progress of China.

The formal opening of the Union Medical College and Hospital at Pekin on Sept. 15th, 1921, adds another chapter to the annals of medicine in this country. The whole plant covers an area of about 10 English acres and costs approximately five million dollars gold. It is the first medical school in the Orient, not only in the magnificance of its architecture, but also in the completeness of its outfit. Great things are expected of this institution.

The Missionary Doctors.

In conclusion, the highest tribute must be paid to the missionary doctors who were the earliest to found hospitals, organise schools, and promote public health and hygiene, &c. They have brought a new light and a new hope to the teeming millions of suffering humanity. Though handicapped by insufficient funds, lack of proper equipment, and other adverse conditions, these men laboured with incessant zeal, gradually gaining ground until Western medicine attained its present position. The institutions they founded are scattered throughout the country. They are not only centres of healing but are also factories of learning, whence, every year, a small army of trained men are sent out to join those in the field to fight the demons of ignorance and disease. Inspired by the noble efforts of these pioneers, the Government and other public bodies have started to establish hospitals and schools of their own. Some of these are well organised and fully equipped. In the years to come the work of the missionary doctors may be eclipsed and eliminated. But their great contribution to medical advancement and to human progress in China will for ever remain.

Conclusion.

Such is a brief epitome of medicine as it has existed and been practised in China. While the Chinese anticipated many discoveries, collected a great variety of facts, invented some valuable methods and brought a few to a high degree of excellence, yet they have never pursued a single subject in a way calculated to lead them to final success. The circulation of blood, anæsthetics, X rays, vaccine therapy, massage, catheters, hypnotism, hydrotherapy, hygiene, organotherapy, &c., had all been hinted at, but remained barren of results until centuries later Western science stepped in and secured the prize. The field of Chinese medicine is still a veritable virgin soil. There are golden opportunities for research workers to break open the hidden wealth of treasures. The day will come when Chinese medicine will pass through this stage of transition to emerge once more purified and strengthened, and lead again the medical thoughts of the world.

RATING OF BRIGHTON HOSPITALS.

As the result of action through the Social Service Centre at Brighton, an agreement has just been reached in regard to the assessment of charitable institutions in the town. Strong representations had been made of the great hardship which would be inflicted upon the hospitals if the figure arrived at by the Corporation valuer, when the town was re-assessed under the Rating and Valuation Act, 1925, were allowed to stand. As the result of the representations, the Corporation valuer (Mr. H. P. Nye), in conjunction with Mr. Gerald Eve, have thoroughly reviewed the position. They took into consideration the assured income of the hospitals as against voluntary contributions, and those institutions which depended mostly on voluntary contributions were valued at a proportionately lower figure than those which derived an assured income from grants from State or municipal funds, or from payments by beneficiaries. The result has been as follows, the figures in parenthesis denoting the original assessment, while the other figures show the new assessment as proposed under the Rating and Valuation Act, and those which now stand as the final settlement. :—

	New. £	Final £
Royal Sussex County Hospital (£175) ..	4,103 ..	2,0
Royal Alexandra Hospital for Sick Children (£48)	1,290 ..	6
New Sussex Hospital (£80)	660 ..	1
Sussex Eye Hospital (£24)	300 ..	2
Sussex Maternity Hospital (£124)	636 ..	4
Sussex Throat and Ear Hospital (£28) ..	450 ..	6
Brighton, Hove and Preston Dispensary (£47)	260 ..	2
Dental Hospital (£24)	90 ..	8

Popular Lecture:

EXPERIMENTS ON FROGS AND MEN.

Delivered before the British Medical Association at Manchester on July 26th, 1929,

BY A. V. HILL, F.R.S.,

FOULERTON RESEARCH PROFESSOR OF THE ROYAL SOCIETY.

MAN is an inveterate experimenter. Those of us who have been happy enough to see small boys at work, who have been small boys ourselves, or indeed are still small boys, will know what joy is found in taking an old alarm clock to bits or a bicycle to pieces, in seeing how fast we can run a hundred yards, in breeding rabbits, pigeons, or canaries, in fixing wireless apparatus together, or, when we are older, in trying a new kind of oil or petrol or even a new kind of medicine. Boys and men, however—by which I mean also girls and women—are not the only experimenters to be found in nature, as any who have watched a kitten or a parrot will know; and experiments made by monkeys have been scientifically studied. Man, however, is the chief experimental animal, both as experimenter and "experimentee." Indeed, in many of man's most joyful adventures he acts in both capacities; he makes experiments upon himself, often to his own great danger or discomfort.

MAN THE EXPERIMENTER.

To run in a Marathon race or to try to swim the Channel, to see how far one can ride a bicycle in 24 hours, to climb to 20,000 feet, to set out to walk (or to fly) to the South Pole, to make a height record in an aeroplane, to dive under the sea, all these involve trials and experiments upon oneself; which is one reason why so many apparently useless feats are performed. Every new adventure on which man has embarked throughout the ages, every change in his social and economic and political condition, has meant experiments upon his bodily frame and organisation, experiments sometimes successful but often followed by disaster.

In learning the use, treatment, and preservation of food he must, unwittingly often, have made millions of experiments upon himself, thousands of them extremely unpleasant, many of them fatal. Without these experiments, however, the present order of civilisation, depending as it does upon a regular supply of food, would have been impossible. When he set out to journey on the sea he experimented on sea-sickness, and later on, as his journeys lengthened, on scurvy and the need of vitamins. When he deserted a natural diet and gathered together in cities he experimented on nutrition and the physiological effects of radiation (or its absence), with rickets as a curious result. When he began to dig deep tunnels, or to work in diving bells or diving suits, he discovered that considerations of the physical solubility of gases in his blood and tissues may affect his well-being, and he invented caisson disease. When he climbed high mountains, or went up in balloons, he discovered mountain sickness, and acclimatisation to it. When he took to rapid manœuvres in aeroplanes he found out that the human factor is a limiting one, that violent acceleration—"centrifugal force"—may play havoc with his circulation and render him suddenly unconscious. Labouring in hot mines, in extremes of climate, with excess or deficiency of sunlight; living on sterilised, preserved, or purified food; breathing quartz dust or carbon monoxide; working with materials which exert a chronic irritation on the skin, or with ultra-violet light, or with X rays and radium; in all such experiments he found limitations to his independence of his external environment; he made experiments upon himself and others, experiments involving ill-health, disaster, and death to many. Even apart from disease, from the experiments which Nature wantonly insists upon making on us, we cannot avoid making experiments on ourselves if we are to do anything new; and, even if we do nothing new, we shall probably find we must make experiments still to discover how to remain just as we are.

NATURE THE EXPERIMENTER.

I am speaking this evening to those, and the friends and relations of those, who spend their lives in mitigating the results of the experiments which Nature makes upon suffering mankind. Some of these experiments involve bacterial infection and, therefore, are, or will be, to some degree avoidable. Others have no known cause, though some day their character too will be revealed. Others are due to functional disturbances in the mechanism—i.e., in the biochemistry and biophysics of the living cells of the body. Some are due to gross lesions which can be seen. Every imaginable ill, great or small, every conceivable torture, physical or mental, you are called upon to witness, and to attempt to alleviate. Some of this suffering is unquestionably due to human folly; some to man's insistence—no doubt for perfectly good reasons—upon living in a civilised industrial state; some to what we call accident—which usually means insufficient skill, or a disregard for human safety. Much sickness is avoidable, and *would* be avoided if only questions of public health and infant welfare were taken seriously enough. Many diseases, however, and their consequences, cannot be prevented altogether, until at any rate we know much more than we do to-day. You can predict the course of the disorder when once it is apparent; you can mitigate its evil consequences; sometimes even you can cure it; but at present you cannot tell us how to avoid it altogether.

Now each of your patients represents an experiment performed by Nature, often apparently a cruel and ruthless experiment, and you—her laboratory assistants—are given a variety of them to witness and to try to learn something from. Nature, however, is an extremely bad experimenter; she is, in fact, the imaginary vivisector of antivivisectionist literature, whose experiments are made without mercy and without apparent cause. So badly and so casually performed are they, so ill-controlled, that it is often impossible for you to reason accurately from them at all. Small wonder that for thousands of years medical knowledge advanced so relatively slowly, when it had to be based only on experiments such as those which Nature provides. For, as all who have tried to reason from experiments have found, these may be good or they may be bad; so well made on the one hand, so carefully thought out and prepared before the event, that one may draw sure and decisive conclusions from them; or, on the other hand, so ill-conditioned, so casually performed, that no certain deduction is possible. In most of Nature's experiments the variables involved are all confused with one another; the factors at work cannot be disentangled; half a dozen functions have been interfered with at one and the same time; the results are not clear cut, and an extraordinary degree of judgment and experience is required before you can reason from them at all.

This cannot indeed be otherwise. To your individual patients you have a duty to perform which is greater than your duty to the rest of mankind. The only way in which the confusion may be avoided is by comparing the results of Nature's casual, random, and complex experiments on human beings with those of simple, properly controlled experiments on living animals. Such a comparison is the means by which in the last few hundred years, and especially in the last seventy-five, medical science has made such startling progress. You can observe, within certain narrow limits prescribed by ethical considerations you can experiment on, man; the idea of the use of criminals for dangerous experiments, common in the past, is repulsive to-day. In any case, fortunately, the supply of criminals would be inadequate! To

acquire a real knowledge of the factors at work, these observations, these limited experiments possible on your patients or yourselves, *must* be compared with the results of simpler experiments on animals, in which it is a matter of little moral importance if the patient dies.

The Example of Claude Bernard.

Many of you will have read with pleasure and instruction "An Introduction to the Study of Experimental Medicine," by Claude Bernard. As Lawrence Henderson says in the introduction to the English translation: "The discoverer of natural knowledge stands apart in the modern world an obscure and slightly mysterious figure." To some he is a magician; to others he is a sort of stage professor, with blue spectacles and a long beard, forgetful and untidy; to a number (including Mr. Bernard Shaw) he is a criminal or a fool; to the majority he is almost entirely negligible, until the newspapers make some preposterous stunt about him, when he receives unwanted attention for a few weeks. "Whoever fails to understand the great investigator can never know what science really is. . . . Not the least merit of Bernard's book is that we have here an honest and successful analysis of himself at work by one of the most intelligent of modern scientists."

I cannot do better than quote what Bernard says about the experimental method: "Man is metaphysical and proud. He has gone so far as to think that the idealistic creations of his mind, which correspond to his feelings, also represent reality. Hence it follows that the experimental method" (by which of course Bernard means not merely the *making* of experiments, which is easy, but the art and science of experimentation, which is difficult) "is by no means natural to man, and that only after lengthy wanderings in theology and scholasticism has he recognised at last the sterility of such efforts. . . . The human mind has at different periods of its evolution passed successively through *feeling*, *reason*, and *experiment*. First, feeling alone, imposing itself on reason, created the truths of faith or theology. Reason or philosophy, the mind's next mistress, brought to birth scholasticism. At last, experiment, or the study of natural phenomena, taught man that the truths of the outer world are to be found ready formulated, neither in feeling nor in reason. These are indispensable merely as guides: but to attain external truths we must of necessity go down into the objective reality. . . . In the search for truth by the experimental method, feeling always takes the lead: it begets the *a priori* idea or intuition: reason or reasoning develops the idea and deduces its logical consequences. But if feeling must be clarified by the light of reason, reason in turn must be guided by experiment."

In these words lies the philosophy of the great experimental physiologist, whose work and outlook are bearing at last such rich fruit in experimental medicine. It may seem curious that the bearing of that fruit has been so long delayed. Henderson is probably right in seeing in the growth of bacteriology, following on the discoveries of Pasteur, the cause which drew men's attention away for a time from the more fundamental study. The magnificent edifice of bacteriology is not yet complete, but one's mind's eye can grasp already what its dimensions, its plan, its proportions, its significance are to be. Thought is returning to Bernard's conception of medicine as an experimental biological science, of which, as he rightly said, zoological vivisection is, and is likely to remain, an integral part.

Let me take an example from Bernard's own work to illustrate how a few controlled experiments on living animals may shed light on the countless uncontrolled experiments of Nature on living man. The existence of vasomotor nerves, the control of blood-vessels by the innervation of the muscle-fibres that lie around them, are matters of ultimate importance, not only in our understanding of bodily functions, but in dealing with the phenomena of disease. In 1851 Bernard made his first communication on the effect of dividing the cervical sympathetic nerve in the neck of a living animal. The ensuing rise of temperature on the affected side, a surprising and quite unexpected phenomenon, led by a long series of researches directly to our knowledge of the vasomotor system. It is almost impossible, as Michael Foster says, to exaggerate the importance of the result, the influence which it "has exerted, is exerting and in widening measure will continue to exert, on all our physiological and pathological conceptions, on medical practice, and on the conduct of human life. Whatever part of physiology we touch, be it the work done by muscle, be it the various kinds of secretion, be it the insurance of the brain's well-being in the midst of the hydrostatic vicissitudes to which the changes of daily life subject it, be it that maintenance of bodily temperature which is a condition of the body's activity: in all these, as in many other things, we find vasomotor factors intervening." In inflammation and in fever, in shock, in any of the disordered physiological functions which constitute disease, whatever be the tissue, vasomotor influences have to be taken into account.

All this dominant knowledge has come from Bernard's initial experiment in cutting the cervical sympathetic nerve. A simple experiment on a living animal suddenly brought a great light into a field where men had been groping in vain with the help only of clinical observation. The result of the experiment was the first clear light which broke upon the subject: and it was the following up of the teaching of the experiment which supplied the interpretation of the hitherto obscure clinical facts.

As Foster rightly claims, we must insist that the experiment in question was what is called, as though it were a term of abuse, a vivisectional experiment, an experiment which many would prevent us from performing to-day, willing though they be, when they go to the doctor, to profit by similar experiments in the past. Such experiments are sometimes declared to be needless, since the knowledge gained by them *might* be arrived at in other ways. It is true that in the course of time, experiments made by Nature or by accident, on human beings, *might* have suggested to some quick mind that nerve-fibres do act on blood-vessels, and how they act. The unbiased inquirer will admit this, but he will also acknowledge that up to the day of Bernard's experiments all the experiments which a seemingly cruel Nature had carried out year after year, and day after day, on millions of suffering men and suffering animals, passed before the eyes of eager observers without suggesting anything more than the dimmest idea of such an action of nerve fibre on blood-vessel. And he will also admit that a single stroke of Bernard's knife—a stroke bringing pain which shrinks into insignificance compared with the pain which it has been the means to spare—laid bare a truth which all Nature's cruel experiments on myriads of men and animals for half a million years had not, in fact, succeeded in bringing to light.

All this our unbiased inquirer will admit. Whatever antivivisectionists may say about the might-have-beens, about the way in which some superhuman intelligence *should* have been able to see the truth without the aid of experiment, there remains the plain, simple historical fact that this discovery, with all its bearing on health and disease, had its origin in Bernard's initial experiment on a living animal. I have recalled, almost without paraphrase, what Foster wrote in 1899. It is no less true in 1929. Would anyone dare to-day, had he the power, to *give* the pain which Bernard's discovery abolished in order to *save* the pain by which the discovery was made? If so, he may call himself a friend of animals but he is an enemy of mankind.

The Value of Animal Experimentation: Harvey and Bernard.

We hear so much objection raised to-day to the use of living animals, for experiments designed to solve the problems which medicine and physiology suppl

at one must continue to insist that nearly all ndamental knowledge in the medical sciences as, in fact, arisen from such experiments. In the edicatory epistle of "De Motu Cordis," addressed o that "most excellent and most ornate man," ie President of the College of Physicians in London, Villiam Harvey, speaking of the experiments on ving animals by which he had for many years emonstrated the fact of the circulation of the blood, emarked: "Neither do Philosophers suffer themselves o be addicted to the slavery of any man's precepts, ut that they give credit to their own eyes; nor do ney swear allegiance to Mistress Antiquity, as openly o leave their friend Truth. For as they think them redulous and idle people, who at first sight do receive nd believe all things, so do they take them for stupid nd senseless that will not see things manifest to the ense, nor acknowledge the light at midday. . . . ikewise all studious, good and honest men do never iffer their minds so to be o'rwhelmed with the assions of indignation and envy, but that they ill patiently hear what shall be spoken in behalf of ie truth or understand anything which is truly emonstrated to them; nor do they think it base to hange their opinion, if truth and open demonstration o persuade them." If only the precept of these ords could be heeded by those who object to the xperiments of Harvey and his successors!

When Harvey, as he said, "first applied his mind o observation from the many dissections of living reatures as they came to hand" to find out the nature f the motion of the heart, he "straightways found it hard thing to be attained, so that he could almost elieve that the motion of the heart is known to God lone." At last, however, "using daily more search nd diligence, by often looking into many and several orts of creatures, I did believe I had hit the nail n the head and thought I had gained both the notion and use of the heart, which I did so much esire."

And so, by the vivisection as he says of "toads, erpents, frogs, house-snails, shrimps, crevisses, and ll manner of little fishes," together with eels, dogs, wine, doves, chicken embryos, crabs, wasps, hornets, nats, bees, geese, rats, sheep, adders, lice, swallows, artridges, hens and swans, modern physiology and nodern experimental medicine were born. For those who, in Harvey's words, are not "stupid and senseless," who are ready to "acknowledge the light at nidday," we have here one of the greatest discoveries f all time; a discovery greater even than that of he circulation of the blood; the discovery that by omparative experiments on "many and several sorts" f living creatures we may reveal the nature and vorking of man's body, we may increase his power nd happiness and wisdom, and cure and protect im from suffering and disease.

This lecture has been entitled "Experiments on rogs and Men." The physiologist's little friend the rog has been chosen as the general type of the xperimental animal, and I have just read you a st of all its colleagues which William Harvey mployed in his discovery of the circulation of the lood. In using these various animals he assumed, nconsciously, what we now know to be a fact, the act (I do not call it the theory) of evolution. He ealised, being a sensible person, that the hearts of nakes or crabs, of snails or fishes, do not differ so nuch from those of the higher animals and man, hat an investigation of the former would throw no ght upon the latter. There *are* differences of course; o reasonable man supposes that by studying the irculation, or, indeed, any function, in the frog or ven in the dog alone, we shall learn enough to make s competent physicians. The differences, however, re often more apparent than real; the fundamental roperties of the ultimate living units—that is, of the ngle cells which build up the various organs—are rprisingly alike. By the methods of comparative hysiology, or of experimental biology, by the choice f a suitable organ, tissue or process, in some animal r removed in evolution, we may often throw considerable light upon some function or process in the higher animals, or in man.

The Further Range of Discovery: Deficiency Diseases.

I have spoken of two discoveries of the more distant past, those of Harvey and Bernard, which were made by the aid of experiments on animals, discoveries on which the practice of medicine to-day is based. Where would you be if you did not know or would not acknowledge the circulation of the blood? How would your patients fare had you never heard of the control of blood-vessels by nerves? To refer to other discoveries, how safe would surgery be to-day had the researches of Pasteur on animals and their applications by Lister on men never been made? When you take a blood pressure, do you or your patients give full credit to the Rev. Stephen Hales, who laid the basis of that particular science, by experiments on living animals performed in the parsonage at Teddington? Do those whom, by a miracle of skilful surgery, you save from the misery of hyperthyroidism and restore to normal health realise that our knowledge of the thyroid gland and the possibility of this particular operation are due alike to the so-called vivisection of animals and men? Brain surgery, renal surgery, the surgery of the nerves, the spleen, the pancreas, the stomach, the ligature and suture of arteries, the use of artificial respiration, the treatment of anthrax, rabies, diphtheria, tetanus, and syphilis (to name only a few); the researches which led to all these were intimately bound up, from first to last, with experiments on, with the vivisection of animals, as well as men. This is a matter—as Foster said about Bernard—of plain historical fact, which those who wish may verify. No manner of abuse or misinterpretation will get over a plain historical fact. Is there a fool so great, or a criminal so wicked, that he would be willing now to *cause* the suffering to men and women which these advances in medical and surgical knowledge have already saved—and will save in the next 50 million years—in order to *prevent* the suffering to animals, such as it was, by which, once and for all, they were achieved?

In 1889 Mering and Minkowski found that complete removal of the pancreas in animals is followed by severe and fatal diabetes, and a long series of experiments led to the conviction that some chemical substance, prepared by certain patches of cells, the so-called islets of Langerhans, existing in that organ are essential to the normal utilisation of sugar by the body. So certain did this seem that—although all attempts to isolate it had failed—the name "insulin" was given to this hypothetical substance by de Meyer, in 1909, and independently by Schafer, in 1916. I need not tell you how the Toronto workers in 1922—only seven years ago—succeeded in isolating this substance, and how effective it has proved in the treatment of human diabetes. Those of us with friends and relations who are maintained in practically normal health by the daily administration of insulin, and who—in all human certainty—would die in a few months were the supply of insulin prevented, can appreciate what experiments on animals have done. Not only did the discovery of insulin rest absolutely upon experiments on dogs, rabbits, and other animals, but even its supply cannot be maintained at present, until scientific knowledge of its nature is advanced much further, without continual experiments on mice and rabbits, for its standardisation. This again is plain historical fact. There are people who assert, and affect to believe, that insulin has no effect on diabetes, or that, in fact, it does harm; they base their assertion on the crude handling of statistics. There are still people who believe that the earth is flat, and that spirits can make images on photographic plates. Have those who protest against insulin ever seen a patient, sick unto death in diabetic coma, pulled as by a miracle out of his sickness and restored to health? Would they dare to condemn to death a healthy happy man, in active work, a man such as many of us know,

but a complete diabetic, by refusing him his daily dose of insulin because it has to be tested and standardised on rabbits or mice? The question really needs no answer; ultimately these are humane people, though they have bees in their bonnets.

It is only three years since the experiments of Whipple on the regeneration of blood corpuscles by dogs, bled and then fed on liver, led to the discovery that pernicious anæmia can be averted, if not cured, by feeding human patients with the same substance, or by treating them with liver extract. It is healthy, I know, to have a certain mistrust of "experts," but it is healthier still to have a mistrust of fools. Those who are qualified to judge, and have seen the evidence, are convinced of the efficacy of this treatment; they have no shadow of doubt about it, and it is plain historical fact again that it was led to by experiments on animals. Unfortunate, maybe, but true! Yet a medical man I once met, a valued member of an antivivisectionist society, asserted in my hearing that the liver treatment of pernicious anæmia is a delusion, since in fact there is no such disease at all; according to him it is really cancer of the bone-marrow—whatever that means (and he himself has a cure for cancer). Whose opinion should the public accept in this matter, which after all is not altogether unimportant since it involves quite a number of human lives?

We hear a great deal in these days about vitamins: the public enjoys the word, especially in America. I once had the privilege of sitting at dinner between two distinguished members of the advertising profession. One, I believe, was an arch bill-poster, the other I found later was concerned with the advertisement of patent foods. Neither knew who I was. The first began: "When I sit down next to a stranger I generally open the conversation by asking him, 'Do you know my distinguished cousin?'"—naming one of the greatest of living investigators. I did, and conversation progressed favourably, finally leading to vitamins. When I turned to my second neighbour I told him how conversation had opened on my other side, and how, of course, it had turned to vitamins. He replied that vitamins were the curse of his existence, that he wished they had never been discovered, that their discoverer was a criminal and ought to be locked up, and so on. He seemed in other respects a reasonable and healthy man, so I made further inquiries. It appeared that in every patent food vitamins have to be present—at any rate in the advertisement—and it gives him sleepless nights wondering how the word (not necessarily the substance) can be introduced. It is true, alas, that any new knowledge can be abased and exploited for commercial purposes, yet it remains a fact that many children and many adults in Great Britain *are* suffering from vitamin lack. Walk through the poor streets of many a great city—I will not say Manchester—at an hour when the children are not in school, and see how many you can spot who are suffering from obvious rickets. Now rickets can be cured—cod-liver oil or radiated ergosterol will cure it—at infinitesimal expense compared with the end to be gained. There is no excuse for rickets any more in a civilised community.

Other deficiency diseases are known—beri-beri, scurvy, &c.—but apart from definite disease, it is probable that many defects or weaknesses, not amounting to definite disease, are due to vitamin lack. We still do not know what most of these substances are, but a means of testing and controlling their activity is available in the feeding of animals. The discovery of vitamins was made by experiments on animals—though I admit that scurvy was discovered inadvertently, and a cure for it invented, by experiments on sailors. My friend, Prof. Elliott, once said to me that to Hopkins, for his work on nutrition and accessory food factors, medicine would owe more than to anyone since Pasteur. I at any rate can testify that Gowland Hopkins's researches involved experiments on animals—did I not work for several years in a coal-cellar at Cambridge, in the company of several hundred of his rats? I never saw him maltreat them—in fact, I have good reason believe him to be the most kind-hearted of mer but this is "vivisection," to give it its legal ti and Hopkins's discoveries were made by "vivisectio in a coal-cellar. I am happy to have lived among rats of such a "vivisector," and to have seen suc discovery emerge.

These matters are not unimportant. Human li and human happiness are involved. Look up history, recent or remote, of medical knowledge a treatment, explore the story of any medical discove and you will find experiments on men and experime on animals inseparately mingled. It cannot, and should not, be otherwise. *Anti-vivisection, in fact, anti-scientific medicine;* and those who work laboratories need a fearless recognition of the f by those who work on patients. Your rewards, soc and financial, are not usually less than theirs; it you who have the ears of our rulers, whether in cotta or in mansion; they remain, to the public, obsc and somewhat mysterious people; it is you, in fa and not they, who can stop, if anyone can, the cri of hindering or preventing medical progress by mea of scientific experiment. The object of our oppone is frankly to put an end to medical research, in so as animals are used, instead of men, for experime They say so openly. You reply that this is inc conceivable. It is not inconceivable; it might very w happen. There are States in America where ev the teaching of evolution is forbidden. Do not England become the laughing stock of the world, l Tennessee!

The Physiology of Sensation.

But enough of these unpleasant and futile cont versial matters; let us turn for a moment to son thing of more interest. You have probably wondered how it is that some things provoke y more than others, how you recognise things as hott colder, heavier, lighter, darker, more or less pain The fact that you can distinguish pain from co or light from sound, is simple to explain—each ha specific kind of receptor, each sends in its messa to the nervous system along a different line. All evidence, however, as garnered from innumera experiments upon the nerves of frogs, tends to sh that a nerve-fibre transmits its messages in an *all none* way. Nervous activity consists of discontinu waves, just as the pressure of a gas is due ultimat to bombardment by its separate particles. Now th waves cannot be varied in degree by varying stimulus—a stronger stimulus does not produce greater wave in the nerve, provided it produces at all. How do we recognise a stronger stimulus, we certainly do? We have indeed the finest app ciation of changes in our environment and in ourselv The physiology of sensation, and of reflex and vol tary muscular response, together with our theories the pathology of the nervous system, depend vit upon an answer to the question—how are we awar variations of intensity in a stimulus applied t sensory end-organ?—and until a very few years no response was forthcoming. All our philosophy the sensory relations of the human body to environment depends upon the answer.

The physiology of the frog's nerve, most caref and fully studied, seemed inadequate to explain t most obvious characteristic of the human nerv system. What an opportunity for scorn for th who expect research to be instantly followed practical application! And yet, lying in this mas exact data obtained on the isolated nerve of the f and on the generalisation built upon it, lay the mea as soon as the modern amplifying valve was app to the action current, to open up a new field of phy logy of great practical importance and of inte theoretical interest.

The nerve impulse had long been known to accompanied by an electric change in the fibre which it travels; this impulse lasts for approxima a thousandth of a second at any spot; it is of the or of size of a few milli-volts, but in a fibre embed in a nerve trunk it is largely short-circuited, and

external effect to be recorded is very small indeed. Without amplification it is difficult enough to record a single wave in a whole nerve trunk with any accuracy, to record it in a single fibre is utterly beyond the reach of any available instrument. With the aid, however, of the tools which wireless engineers have provided, single nerve waves in single nerve-fibres can be amplified and recorded, and a whole new world of hurrying, scurrying activity is opened up to analysis.

The opening up of this new world is chiefly the work of Prof. Adrian and his pupils, and the answer to our question is at once apparent. The sensory end-organ records a greater strength of stimulus by a *greater frequency* of response. A heavier pressure on the skin sets up a greater number of nerve messages per second in the fibres running into the nervous system; a brighter light, a greater tension in a muscle, a hotter body, a stronger pinch or prick, are registered by a greater frequency of the impulses evoked by it. The experiments, conducted with splendid simplicity and skill, have left no doubt of the quantitative nature of sensory response. Not only can the separate waves in an afferent nerve-fibre be registered photographically, but they can even be transformed into sound and heard in a loud speaker. The physiology of sensation has taken a new jump forward, and nobody with a particle of scientific imagination can doubt that this new knowledge will have important bearings upon the pathology of nerve affections.

This work, however, has developed not only on the afferent or sensory, but also on the efferent or motor side of the nervous system. For a quarter of a century it has been believed that the only way in which the strength of a muscular response can be graduated is by a graduation of the *number* of muscle-fibres involved in it. All skilled movements, all fine work, the economy and precision which are rightly so much esteemed in the trained performer, which are lost in various disorders of the nervous system, all depend upon this precise grading of muscular effort. It seems now from Adrian's work that variation of the number of fibres involved in a muscular response is only the *coarse* adjustment; the fine adjustment is due to a graduation of the frequency with which the muscle-fibres are excited by their nerves. Here, again, in its bearings upon our theory of the working of the nervous system, we have a very fundamental fact. Such facts have been established by experiments on frogs, eels, rabbits, and cats—by "vivisection," that is to say, to give it its official title—though I am sure that no pain, worthy of the name, has been caused by them. They have been confirmed by experiments on men. At a meeting of the Physiological Society, Prof. Bronk, a collaborator of Prof. Adrian, had a fine electrode thrust into an arm muscle, and the resulting action currents were led off to an amplifying system and thence to a loud speaker. As he varied the force exerted by his muscle, the pitch of the sound emitted by the loud speaker waxed and waned; at first a rattle like a machine gun, and finally a musical note; one *heard* a single human muscle-fibre varying the strength of its contraction. No doubt the result *might* have been attained by a superhuman intelligence, without preliminary experiments on animals; it is a matter, however, of simple historical fact that it was not so attained, but that experiments on frogs and tortoises and eels, on dogs and cats and rabbits, were the *actual* path by which the result was reached. If anyone dares to assert that it is unimportant, the history of all scientific thought is against him. Indeed, if the understanding of anything at all in man's universe is important—which, of course, some people deny—it is of his own central nervous system.

The Central Nervous System.

Let me illustrate the matter further by a recent experience of my own. It is known that the extremely complex functions of the central nervous system depend upon an adequate supply of oxygen, that without oxygen they rapidly fail. It is known that central nervous activity is readily modified by fatigue. Now in trying to discover the fundamental nature of the activity of the nervous system we need something simple to work with; the central organ itself is so utterly out of reach of direct experiment, so hopelessly changed by isolation or interference, that we can do little but fire messages in, in various ways, and observe what comes out again. The study of the spinal cord and brain has become, in fact, the study of reflexes, whether automatic or conditioned, a study which in the skilful hands of Sherrington, Magnus, Pavlov, and many others, has opened new vistas of research and knowledge and promised—or indeed begun to provide—a rich harvest to the neurologist. The magnitude of their achievement I should be the last to under-estimate, but they would be the first themselves to recognise that their methods alone cannot solve the whole problem. What are the individual cells and fibres doing during activity? What are the physico-chemical changes involved in excitation, inhibition, and facilitation in the central organ? What *is* the central excitatory state revealed by Sherrington's experiments? Can we give some picture of the central nervous system based upon the elementary properties of the isolated nerve? A very difficult problem, which many people have tried and are trying to solve.

Let us consider an analogy. For centuries the movements and properties of the heavenly bodies have been studied. Astronomical discovery is perhaps the noblest monument to the human intellect. To-day, however, the flood of light which is being poured afresh upon the dimensions and time-relations, the history and evolution of the universe has resulted, not chiefly from astronomical observation as such, but from the labours of physicists in their studies of radio-activity, of spectra, and of the conduction of electricity through gases, and of mathematicians in their theories of the interchanges of radiation and matter. In 1929 the picture which science gives us of the universe is based upon the properties of atoms, electrons, energy, and radiation. So it must be with the central nervous system. In the solution a necessary step is to learn in greater detail the properties of the central nervous cells and of the fibres which project from them; we need to know them not only by their works at a distance, but by near and personal acquaintance. Keith Lucas made a first attempt to explain the fundamental characteristics of the central nervous system on the basis of those of the medullated nerve-fibre of the frog, an experimental object whose clear-cut functions we can investigate methodically in the laboratory by rigorous physical methods. Lucas's attempt has not been wholly successful; although patches of light have been thrown upon central nervous function by work upon the isolated medullated nerve of the frog, there is still much that remains obscure.

It may be that a further little step, in this type of analysis, is possible. It happened by good fortune some three years ago, at the Marine Biological Laboratory at Plymouth, that I examined the limb nerves of Maia, the spider crab. Other people, of course, have done this before, but they did not chance to have a galvanometer at hand. The activity of this tissue can readily be measured by recording its electric response to stimulation. To our astonishment the nerve was found to be obviously and highly fatiguable. It is almost impossible, as you know, to fatigue a medullated nerve. Students make experiments to show that it cannot be done. The researches of my colleagues, Levin and Furusawa, have shown this non-medullated nerve of Maia to possess some most interesting properties—properties which one would like to see examined as the possible material for an analysis of the central nervous system. The nerve can be fatigued, almost to complete exhaustion, by stimulation for a few minutes. Fatigue at the point of stimulation is greater than at a distance from it. In the presence of oxygen it recovers; in the absence of oxygen it does not. At 16° C., 25 minutes are required for complete recovery, from six seconds only of stimulation. Only 2 per cent. of the energy involved in activity is liberated during the passage of the

impulses produced by excitation, nearly 98 per cent. in the succeeding 25 minutes of recovery. The normal resting state of the nerve is accompanied by an electrical potential difference across its surface. The potential difference is diminished or abolished by stimulation or by oxygen-want; here is an obvious and lasting effect of activity, which was not known at all in medullated nerve. In the presence of oxygen the potential difference is slowly restored, just as though it were due to a little accumulator which has to be recharged by a dynamo when it is run down. The energy used is many times as great as in the case of the medullated nerves previously examined. Hence perhaps the rapid onset of fatigue. There is evidence that the maximum frequency at which the nerve transmits its impulses rapidly decreases as activity continues.

Now the central nervous system consists largely of grey matter—that is, of nerve cells and of non-medullated nerve processes; only to a minor degree can its properties depend upon its medullated fibres. In the fatiguability, in the large amount of energy used, in the dependence on oxygen, in the varying degree of electric polarisation of its surface, may we not see in the crab's non-medullated nerve, more faithfully reproduced, the properties of the central nervous cells, than in the simple medullated nerve of the frog?

I realise that I am only guessing. Investigation as yet has not had time to enable us to do more. I am showing you, so to speak, Bernard's process of *feeling* at work. Nothing may come of it after all; feeling is often wrong. Only future research will show whether the comparison will prove fruitful, and I do not claim that any particular problem has been solved. I give you the comparison merely to illustrate a very early stage in scientific procedure. If, however, the guess proves to be right, we have here an example taken straight, so to speak, from the factory, of the principle which Harvey's work so fully emphasised of the advantage of trying your experiments "on many and several sorts of creatures," on any living animal on which you can lay your hands. The most unexpected creature in the world—even the spider crab crawling about at 20 fathoms—may help you to solve a riddle which would prove quite insoluble so long as your only experimental animal is man.

Experiment the only Way.

Is it indeed conceivable that we can find out about life without examining life? The whole history of human knowledge and progress tells us the danger and folly of scholasticism and unverified hypothesis, the advantage of unbiased experiment and observation. If you wish to find out about the stars you must observe the stars, you must experiment with the materials which you suspect the stars to contain, you must try to reproduce, and to experiment under, the conditions which obtain in the stars; you must study spectra, electrons, radiation, gravitation; you will not be content merely with pictures of the sky at night. If you want to solve the problems of flight you must experiment on flight; you will never solve them merely by examining dead birds or fossil birds, or even living birds in cages. If you want to understand the properties of matter you must make experiments with matter, and apply mathematical calculations to your results as necessary; it is not sufficient to read what the Greek philosophers said about matter. If you want to know how living things evolved you must examine the strata of the earth, in which you can find them in their various stages of evolution ready to look at. You must not be content with the first chapter of Genesis. If you want even to play tennis you must experiment in playing tennis—all the books in the world will teach you nothing without the practical experience. So, if you want to understand life and the problems involved in life, if you want to acquire the power which an understanding of living processes will bring you, you must observe living things, you must take them to pieces to see how they work, you must become familiar by long experience with the way they behave.

Living processes, as Bernard upheld, are subject to the same determinism as the phenomena of the inorganic world. Cause and effect are related in the same way. There are no spooks, no spirits, no magic, no supernatural agency, no lack of causal relationship to hinder us from applying the same kind of exact quantitative experimental analysis as men are accustomed to apply to the facts of physics, chemistry, engineering, or astronomy. The only difference is that the problems of physiology, taken in its widest sense, are far more difficult and complex that those of the so-called exact sciences. The problems of biology require greater and not less experimental skill, more patience and not less, more time to unravel, more judgment and more understanding for their solution. Biology is *not* a soft job, for people with second-best brains; though physicists and chemists sometimes affect to think so. There is no evidence, however, that its problems are not ultimately soluble. We may not solve, as the newspapers would say, the "mystery of the origin of Life"; any more than astronomers can tell us how the universe of matter, energy, and radiation came into being in the beginning. Probably there *was* no origin and there *was* no beginning; at least there is no evidence at all on the subject. The real difficulties in biology are great, but they are experimental difficulties, not philosophical ones. If we wish to understand life we must experiment with it, not talk about it. Our experimentation, of course, must be led to by hypothesis, for random experimenting is as useless, as dangerous, as unverifiable hypothesis; but when once we have appealed to Nature to judge between our theories, we must accept her decision, without bias of hypothesis, or philosophy, or religion. We must trust absolutely to experience, guided by reason. *We must admit no challenge to the arbitration of experiment, except better and better and still better experiment.* The field of biology is vast, much of it is still quite unexplored, but we have a few landmarks to guide us. The fact of evolution is certain, the fact of determinism, the fact that the laws of the inorganic world apply in biology with the same precision as elsewhere. The field is not ripe yet for much more theory—exact quantitative experiment on living creatures and tissues is the present need, and will remain so for many years to come.

How, then, shall we proceed? By experiments on man? Surely, for man is the only experimental animal who will coöperate fully with the experimenter, and most important results have been obtained in recent years by controlled experiments on man. Besides, the habit of experimenting on man, on themselves and their friends, is a valuable lesson to learn for all those whose lives are to be devoted later to medicine; and no less important should it prove in connexion with the scientific study of industrial and social welfare. Let us, however, insist and continue to insist that human physiology and medicine are branches of biology as a whole. Man has a kinship, through evolution, with all the plants of the earth, the beasts of the field, the birds of the air, the creatures of the sea. Fifty years ago this conclusion was opposed by all the resources of sentiment and of organised religion. Even to-day there is widespread objection among the uneducated to the teaching of evolution, but none on the part of those who have studied the evidence. We *are* akin to the other creatures, and a frank acknowledgment of the fact need not, in fact does not, diminish our appreciation of the nobility of human nature or of the sanctity of human life. One objection to the use of animals in experimental medicine is undoubtedly the same old anti-evolutionary prejudice. To-day, however, the conclusion cannot seriously be contested, Bernard is admitted to be right, medicine and human physiology *are* branches of experimental biology. We must make them so in fact as well as in theory, in hospital and laboratory as well as in lecture room.

Let us advance, therefore, by experiment, hopefully and without fear. Harvey, by his experiment "using daily more search and diligence, by ofter

looking into many and several sorts of creatures," did finally "hit the nail on the head" and so laid the basis of modern scientific medicine. To-day there are unlimited opportunities for experimental biologists, adequately schooled and disciplined in hard reasoning and exact methods, in its border sciences. From frogs to elephants upwards, from frogs to filtrable viruses downwards we may take our choice, according to the demands of the experiment; and the end of it is man. Puny, fearful, unreasonable, selfish he may sometimes be; yet possessing always elements of nobility, courage, kindness, and devotion such as no other animals possess, which make him, as was said 1900 years ago, "of more value than many sparrows." On his behalf, for his health, his happiness and his wisdom, for his freedom from suffering, superstition, and ignorance, experimental biology and experimental medicine should be ready to sacrifice, if needs be, many sparrows and many frogs.

TREATMENT OF CHOREA BY NIRVANOL.

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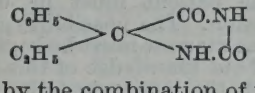
A NEW method of treating chorea with a preparation called nirvanol has recently had a fairly wide trial in Germany. In most clinics where the method has been used it has met with such constant success that it continues to be employed in severe and obstinate cases. Up to the present, knowledge of this form of therapy has failed to reach the shores of England or America, and we have been unable to find any reference to nirvanol in the literature of either of these countries.

During the last few months we have used the method in six cases of chorea, and have been sufficiently impressed with its favourable results to think it worth while to bring this new form of treatment to the notice of the English medical profession, so that it may receive more general trial in this country.

Nirvanol is composed of γγ-phenylethylhydantoin, and has the following formula:—



It is formed by the combination of urea and glycol, and was originally used as a hypnotic for sleeplessness and as a sedative in epilepsy and various types of psychosis. In chorea, relatively smaller doses are used, and successful results are not due to any hypnotic effect, but to a specific reaction which occurs after several days' oral administration. This reaction, on which the whole treatment depends, is akin to serum disease, or a mild anaphylactic shock, and is so distinct that it has been named nirvanol disease.

Method of Treatment.

The drug is administered by the mouth in daily doses of 0·3 g. for a child of 9 to 14 years of age. In most cases 8 to 14 days after beginning the treatment a well marked morbilliform rash appears usually accompanied by pyrexia. The drug is stopped directly this reaction occurs. The rash is at first composed of tiny red macules which, in the course of a day or so, enlarge and become slightly raised. The distribution varies, but usually the eruption is first noticed on the chest, abdomen, and elbows. From here it spreads to other parts of the limbs, the extremities being particularly affected, and spots are nearly always visible on the dorsum and soles of the feet, and sometimes on the palms of the hands. The back may be involved, but the face generally escapes. After about four or five days the rash gradually disappears, hardly having reached a definitely papular stage, and rarely becoming confluent except on the elbows. In our cases the rash always had this morbilliform character, but other observers have noted urticarial and scarlatiniform eruptions. There are few subjective symptoms, but conjunctivitis, pharyngitis, cervical adenitis, and slight œdema of the eyelids and face are apt to occur. Vomiting is uncommon, but there may be slight headache and drowsiness. The nirvanol rash does not usually irritate and, accompanied by these other slight manifestations, is strikingly like rubella. Its tinge, however, is not the typical pink of this infection, and more closely resembles a mild attack of measles, although the absence of true Koplik's spots is a valuable differentiating sign. In fact, this peculiar rash is best described as falling between these two exanthemata, not quite resembling either in some of the most important details.

The continental writers state that the temperature may be considerable for several days, rising as high as 104° F. in some cases, but in our patients this high pyrexia did not occur, and two remained afebrile throughout, although the rash was well marked. In any case the reaction is over by the third to fifth day, and it has been noticed that the earlier it is evoked in the course of treatment, the more severe is the rash, and the longer the duration of the temperature (Leichtentritt, Lengsfeld, and Silberberg).[1] Just before the onset of the fever the choreic manifestations seem to be aggravated, but with the disappearance of the rash they improve with dramatic suddenness, and are generally completely arrested within a week or ten days. In certain cases the reaction is delayed until the 24th day, and in others a curious secondary reaction may arise, similar to the primary one, 17 to 39 days after starting treatment (Leichtentritt et al)[1]. This occurs as long as 12 days after the drug has been stopped, and may occasionally be very severe (Keller).[2] Heart lesions, present at the time, are apparently unaffected and certainly not made worse, but in the German reports, details of the cardiac condition in the cases treated are meagre. In one of our cases the chorea was complicated by early carditis with dilatation. We had the impression that this was favourably influenced, and the heart had certainly resumed its normal size with the arrest of the chorea, although an apical systolic murmur persisted. The treatment has not been long enough in practice for us to form any opinion as to the ultimate prognosis. One or two cases have been described in which a relapse occurred many months after the first successful nirvanol treatment. In these children, nirvanol arrested the chorea again without producing the typical reaction on the second occasion (Keller,[2] Huber).[3] A few successful cures have also been reported in cases treated for the first time, which have shown little or no reaction (Schmal).[4] But in both instances the effect of the drug on the blood-picture is generally well marked despite the absence of rash or fever.

The most constant change in the blood is a true eosinophilia, which reaches its maximum just before the appearance of the rash. In addition, during the administration of the drug there is generally a leucopenia with a decrease of the polymorphonuclear cells and, at the same time, a relative lymphocytosis and monocytosis. With the subsidence of the general reaction the blood-picture gradually resumes the normal. These changes were mostly present in five out of our six cases, and have been tabulated on the accompanying charts. Eosinophilia appears to be one of the prominent features of nirvanol disease and, as already indicated, may occasionally be the only evidence of a reaction.

For the treatment to be successful one must aim at producing nirvanol disease, and with this in view a sufficiently large dose of the drug must be given, but there is as yet no means of regulating the severity of the reaction. It is wise never to exceed a daily dose of 0·3 g. of nirvanol. The drug must be stopped immediately the typical reaction (rash, fever, and so

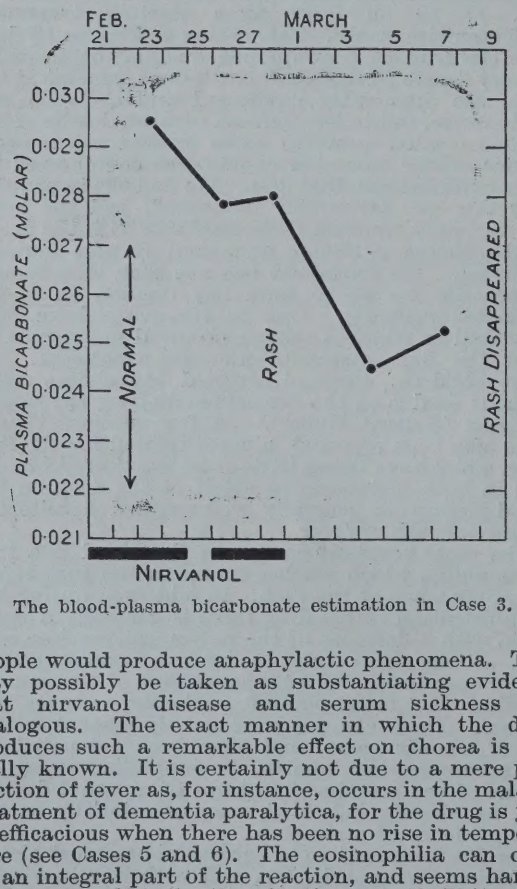
forth) appears, and if this has not occurred by the fourteenth day it is useless and even dangerous to proceed with the treatment (Huber).[3]

Pathology.

de Rudder[5] likens the reaction of nirvanol to that of serum disease, in which an alteration of the acid-base equilibrium of the blood has been found. He states that there is at first an alkalosis approaching a pro-anaphylactic tetany. The peripheral nerves share in the general stimulation, and this no doubt accounts for the temporary aggravation of the choreic movements. At the moment of the eruption the alkalosis is changed into an acidosis, and it is this sudden alteration presumably, which he claims, has such a marked effect on the central nervous system. Dr. W.W. Payne has investigated this point on two of our cases (Cases 3 and 4), and by measuring the blood plasma bicarbonate has been able definitely to confirm a tendency towards alkalosis during the administration of the drug, but was unable to establish any sudden swing over to acidosis. His estimations are tabulated in the Figs. 1 and 2. It will be noticed that, taking Blackfan and Bengt Hamilton's[6] figures, 0·022 to 0·027 molar as the normal, the plasma bicarbonate in Cases 3 and 4 was increased after a few days administration of the drug, but it never dropped below normal during the course of treatment. Thus there appears to be a tendency towards alkalosis, but not to an acidosis.

The usual effect of nirvanol appears to be absent in certain patients, and it is interesting to note that they are also resistant to the various sera, which in normal

FIG. 1.

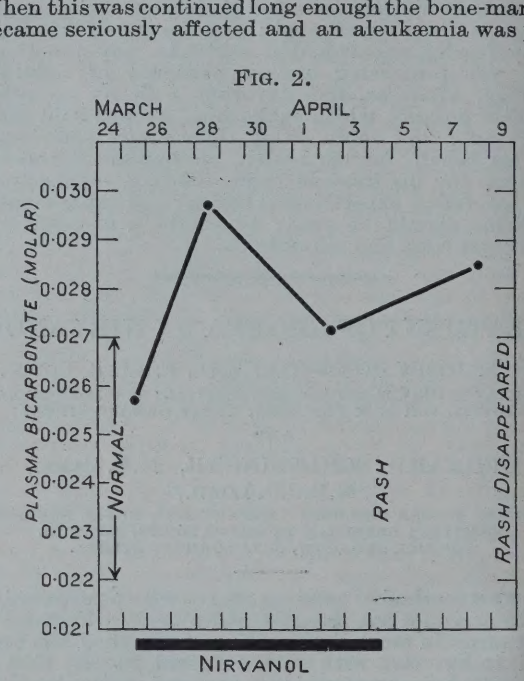


The blood-plasma bicarbonate estimation in Case 3.

people would produce anaphylactic phenomena. This may possibly be taken as substantiating evidence that nirvanol disease and serum sickness are analogous. The exact manner in which the drug produces such a remarkable effect on chorea is not really known. It is certainly not due to a mere production of fever as, for instance, occurs in the malaria treatment of dementia paralytica, for the drug is just as efficacious when there has been no rise in temperature (see Cases 5 and 6). The eosinophilia can only be an integral part of the reaction, and seems hardly likely by itself to be the effective agent. If it were, other substances provoking eosinophilia might presumably have a beneficial action on chorea similar to nirvanol. We can hardly believe the explanation is that of protein shock.

Extensive animal experiments have been performed by Leichtentritt, Lengsfeld and Silberberg.[1] They produced shock in rabbits by injecting them intravenously with serum of patients previously treated with nirvanol, but there was no eosinophilia. Oral administration of the drug to these animals caused a marked leucopenia with relative lymphocytosis. When this was continued long enough the bone-marrow became seriously affected and an aleukæmia was produced, closely resembling that occurring in benzol or salvarsan poisoning, and after an excessive use of X rays and radium.

FIG. 2.



The blood-plasma bicarbonate estimation in Case 4.

Dangers.

Although the six cases we have treated ran a mild and favourable course, these experimental results serve as a warning that nirvanol is not a harmless drug, and that its exhibition, if not closely watched, is liable to be dangerous. It should never be given unless the doctor in charge is conversant with its action, and the patient must be under constant medical supervision. The possibility of a deleterious effect on the bone marrow must be kept in mind in the present stage of our knowledge of this treatment, and a watch kept on the leucocyte fall. Even with the most careful administration, alarming results have been reported on rare occasions. For example, Keller describes the following case. After a typical reaction occurring on the sixth day of nirvanol treatment, followed by a striking arrest of the choreic movements, the drug was stopped immediately and the patient appeared to be cured. Eleven days later, however, a severe secondary reaction set in with high fever, headache, and a second scarlatiniform rash, tonsillitis, gingivitis, stomatitis, nephritis, enlargement of the liver and spleen with jaundice, blood-stained diarrhœa, swelling of the face and œdematous ulceration of the upper lip. A protracted recovery eventually ensued, and was complicated by troublesome furunculosis. There was some reason to believe that the formidable secondary reaction in this case was brought on by accidental exposure to sunlight. This may have been a coincidence, but since another severe secondary reaction has been reported after giving artificial sunlight to a patient who had just finished his course of nirvanol, it appears wise to guard against such rays for two or three weeks after this form of therapy.

The rash may very occasionally extend to the bronchial mucous membrane as in measles, and give rise to broncho-pneumonia (Pilz).[7]

Results.

Good reports of nirvanol have come from various German clinics. Roeder[8] in Gottingen, Rietschel,[9] and Hester[10] in Wurzburg, Husler[11] in Munich, Matzdorff[12] in Breslau, Huber[3] and Schmal[4] in Berlin, Keller[2] in Karlsruhe, all subscribe to the effectiveness of the drug. Two other independent observers, however, Bendix[13] and Buttner, are not so enthusiastic, and find no advantage in nirvanol over any other form of treatment of chorea.

Judging from the following cases treated by this method, we have been impressed by the beneficial effect of the drug on chorea, and the disappearance of the movements has certainly seemed to us to be more rapid and complete with this form of treatment than with any we have employed hitherto.

CASE 1.—A girl, aged 11, had been suffering for three weeks from severe acute chorea, which had probably been precipitated by overworking for a musical scholarship. She had suffered from pains in the limbs six months previously.

March 28th, 1929: On admission, movements were incessant, and the child was very restless with speech affected; heart normal. April 3rd: Nirvanol started, 0·3 g. daily. 5th: Sore throat; restlessness increased. 6th: Slight headache; temperature 101·4°; tachycardia, 140. 7th: Temperature subsided; pulse-rate 100. 8th: Mild conjunctivitis; no change in chorea. 13th: Rash appeared first on both elbows; scattered papules on hands, wrists and soles of feet; nirvanol stopped. 15th: Rash more extensive and irritating. 16th: Rash still developing and confluent in certain areas. 17th: Rash fading; chorea improving. 29th: No chorea.

Blood Counts (Case 1).

Date in 1929	Leuc. per c.mm.	Pn. cells. per cent.	Lym. per cent.	L.Mn.cells. per cent.	Eos. per cent.
2/4	10,000	55	38	6	1
5/4	18,000	42·5	49	4·5	4
9/4	14,000	47·5	48	4	0·5
12/4	16,000	45	50	4	0·5
16/4	20,000	58	38	3	1
23/4	13,000	56	37	4·5	2·5

Leuc. = leucocytes. Pn. = polymorphonuclear. Lym. = lymphocytes. L.Mn. = large mononuclear. Eos. = eosinophiles.

CASE 2.—A boy, aged 10 years, had been suffering from mild but persistent chorea for three months, which had not improved under treatment at home. There was no previous history of rheumatism.

Feb. 19th, 1929: On admission, mild chorea present; heart showed some enlargement to the left with systolic murmur at the apex; normal temperature. 19th to 28th: Rest in bed without drugs produced no improvement. March 1st: Nirvanol started, 0·3 g. daily. 6th: Slight puffiness of the eyelids; heart resumed a normal size, but systolic murmur persisted. 9th: Temperature 99·6°; no alteration in pulse-rate. 10th: Rash appeared, morbilliform in character; face flushed, macular rash all over the body, conjunctivitis, infected fauces and a few small white spots on the buccal mucosa; axillary glands palpable; sore throat, but no other symptoms; temperature 99·4°; nirvanol stopped. 11th: Temperature subsided. 12th: Rash faded; movements less. 21st: No chorea.

Blood Counts (Case 2).

Date in 1929.	Leuc. per c.mm.	Pn. cells. per cent.	Lym. per cent.	L.Mn. cells per cent.	Eos. per cent.
28/2	12,000	38	52	3·5	6·5
5/3	9,000	37	49	5	9
6/3	8,000	50	37	4	9
10/3	6,000	23	62	3	12
5/4	10,000	40	49	2·5	8·5

Leuc. = leucocytes. Pn. = polymorphonuclear. Lym. = lymphocytes. L.Mn. = large mononuclear. Eos. = eosinophiles.

CASE 3.—A girl, aged 8½, had been suffering from chorea for three weeks. She had had repeated severe attacks of chorea during the last two years, associated with headaches and bouts of vomiting. No history of any other rheumatic manifestations.

Blood Counts (Case 3).

Date in 1929.	Leuc. per c.mm.	Pn. cells. per cent.	Lym. per cent.	L.Mn. cells per cent.	Eos. per cent.
22/2	9,200	64	32	4	0
25/2	8,200	48	48	8	5
28/2	5,200	59	27	3	12

Leuc. = leucocytes. Pn. = polymorphonuclear. Lym. = lymphocytes. L.Mn. = large mononuclear. Eos. = eosinophiles.

Feb. 15th, 1929; On admission there was moderate chorea with considerable hypotonia which showed no improvement with rest in bed; heart normal. 21st: Nirvanol started; 0·25 g. daily. 25th: Temperature 100°; nirvanol omitted for 24 hours. 26th: Nirvanol recommenced, 0·25 g. daily; temperature normal. 28th: Morbilliform rash; nirvanol stopped. March 13th: No chorea.

CASE 4.—A boy, aged 10, had had three mastoid operations, and following the last one, chorea had developed two weeks before readmission to hospital. At the same time there was a history of pains in the limbs.

Jan. 14th, 1929: On admission chorea was of moderate severity and movements were even present during sleep. No definite evidence of cardiac involvement. Treated with bromides and arsenic, but without improvement. 24th: Chorea still well marked. Feb. 12th: Movements not so evident. 25th: Relapse of chorea. March 4th: Bromides and arsenic stopped; tolysin treatment started. 11th: Chorea still present. 25th: Nirvanol started, 0·25 g. daily. April 1st: Temperature 99·8° for one day. 4th: Rash appeared first on the wrists, morbilliform in character; nirvanol stopped. 5th: Rash spreading. 9th: Rash disappeared; chorea absent. May 23rd: Report from convalescent home stating that there has been no return of symptoms.

Blood Counts (Case 4).

Date in 1929.	Leuc. per c.mm.	Pn. cells. per cent.	Lym. per cent.	Eos. per cent.
23/3	11,000	49	44	1
27/3	10,000	55	42	1
30/3	5,000	20	70	5
2/4	11,000	54	31	5
5/4	10,000	50	35	5
9/4	16,000	70	25	2

Leuc. = leucocytes. Pn. = polymorphonuclear. Lym. = lymphocytes. Eos. = eosinophiles.

CASE 5.—A girl, aged 12, had been suffering from chorea for two months. Five years previously she had had a similar attack lasting three months, which was treated in turn with chloretone, bromide and arsenic. The present attack dated from an influenzal infection, and was at first treated by rest in bed at home together with salicylates, but without improvement. Heart normal.

April 25th, 1929: On admission to hospital the chorea was moderate, and affected the tongue and the right side of the body more than the left. May 4th: No improvement from rest in bed and aspirin; nirvanol 0·3 g. daily started. 5th: Slight drowsiness. 6th: Slight increase in chorea; drowsy. 7th to 11th: No change. 13th: Rash appeared, starting on the elbows and spreading thence to the chest, abdomen, soles of the feet and palms of the hands; a few spots on the mucous membrane of the lower lip; nirvanol stopped. 14th: Rash more clearly defined; a few papular spots and erythematous patches most marked on the elbows, fading easily on pressure; slight enlargement of the occipital glands. 16th: Rash fading; movements less. 21st: Rash has disappeared. 22nd: No chorea; there was no appreciable alteration in temperature throughout the treatment.

Blood Counts (Case 5).

Date in 1929.	Ery. per c.mm.	Leuc. per c.mm.	Pn. cells. per cent.	Lym. per cent.	L.Mn.cells. per cent.	Eos. per cent.
2/5	4,960,000	4,600	49	46	3	2
7/5	5,300,000	4,500	41	52	3	3·5
13/5	5,000,000	5,000	46	38·5	6·5	7·5
15/5	5,300,000	6,000	35·5	51	5	8·5
21/5	5,600,000	4,400	48	43·5	1·5	2·5

Ery. = erythrocytes. Leuc. = leucocytes. Pn. = polymorphonuclear. Lym. = lymphocytes. L.Mn. = large mononuclear. Eos. = eosinophiles.

CASE 6.—A girl, aged 12½, had been suffering from chorea for five weeks with involvement of the speech. The onset of chorea was accompanied by joint pains which lasted for a few days. No previous history of chorea or other rheumatic manifestations.

Blood Counts (Case 6).

Date in 1929.	Ery. per c.mm.	Leuc. per c.mm.	Pn. cells. per cent.	Lym. per cent.	L.Mn.cells. per cent.	Eos. per cent.
4/5	4,520,000	4,000	48	40.3	10	1·6
8/5	—	5,000	44·8	42·4	7·2	1·6
12/5	6,000,000	4,800	50	43	6	1
15/5	5,500,000	6,500	45	45·5	6	3
17/5	5,300,000	4,800	48·5	45	4	0·5
21/5	5,500,000	7,300	59	36	3·5	1

Ery. = erythrocytes. Leuc. = leucocytes. Pn. = polymorphonuclear. Lym. = lymphocytes. L.Mn. = large mononuclear. Eos. = eosinophiles.

May 2nd, 1929: On admission there were well-marked movements affecting the face, body and limbs, the left arm being very hypotonic; speech was bad; heart normal. 4th: Nirvanol, 0·15 g. 5th: Nirvanol, 0·45 g.; slight headache. 6th: Nirvanol, 0·3 g., which was then repeated daily; drowsy at times; no change in chorea. 7th to 12th: No change. 13th: Rash appeared; macules on elbows, chest,

abdomen, forearms and palms of the hands; one red spot on mucous membrane of the lower lip; nirvanol stopped; no change in movements. 14th: Rash more marked, morbilliform in character over neck, face, and trunk; a few papules on dorsum of the feet. 16th: Rash fading; chorea improving. 18th: Rash has disappeared; great improvement of chorea during last three days; there was no appreciable alteration in temperature throughout the treatment.

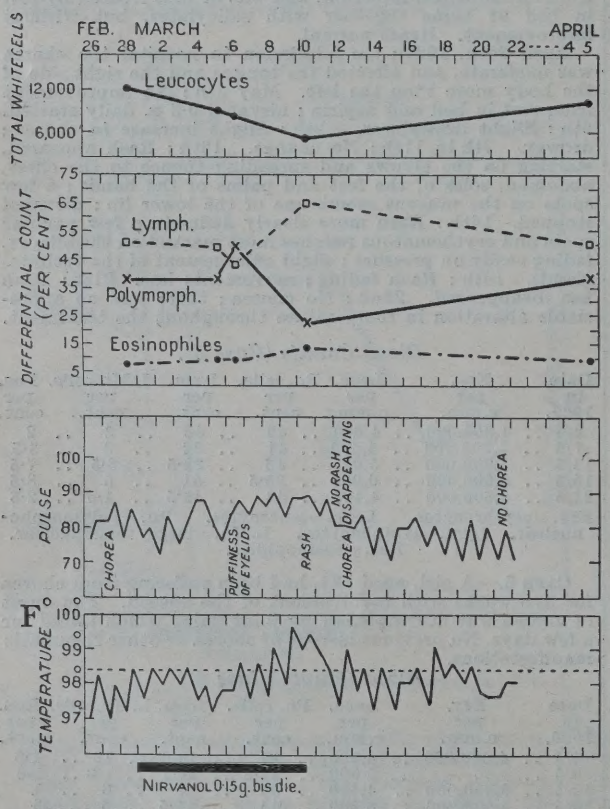
The effect of nirvanol on the blood was fairly constant in the first five cases, and followed pretty closely the changes referred to in the text. Cases 2 and 4 are such typical examples that they have been graphically represented (Figs. 3 and 4). There was no appreciable alteration in the blood count of the sixth case, and it is interesting to note that, unlike the others, this boy, although greatly improved, could not be counted completely cured.

Conclusion.

Other attempts have been made to treat chorea along similar lines. The method of Duzar in which adrenalin is injected intravenously, while at the same time alkalosis is produced by large doses of sodium bicarbonate by the mouth, has perhaps received the greatest attention, but it appears to be cumbersome and unreliable.

Judging from the many accounts from various independent sources, since Roeder's original communication in 1919, nirvanol certainly does seem to be a potent drug, which is effective in the treatment of chorea, and has the advantage of oral administra-

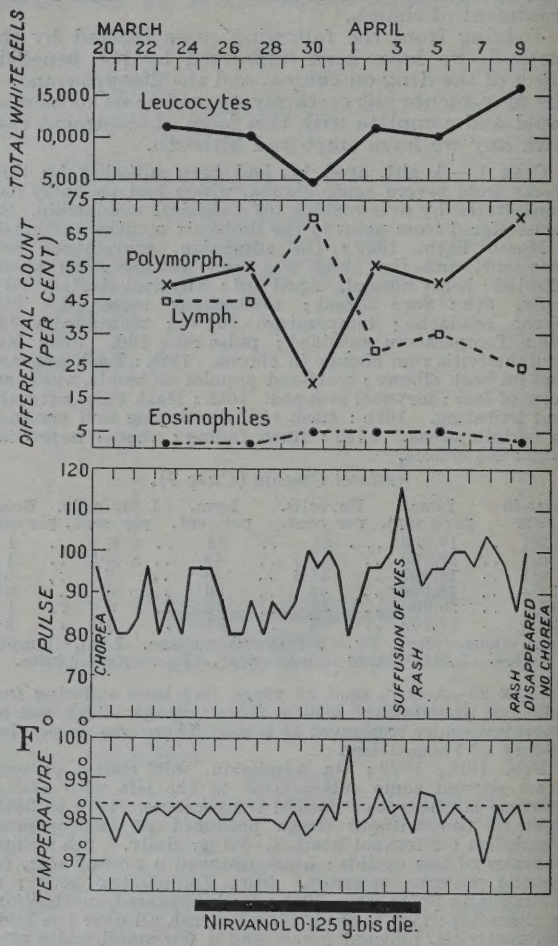
FIG. 3.



Blood counts, temperature, and pulse-charts of Case 2.

tion. Against this is the fact that there is a small element of risk in the treatment, and for this reason it may be considered unjustifiable to take such heroic measures to combat a self-curable disease. On the other hand it seems unwise to dismiss nirvanol summarily on this plea alone. We have all seen the severest cases of chorea recover with only the most trifling symptomatic treatment, but we have also seen these cases develop permanent heart disease before they are finally cured. It may be that the arrest of chorea before it has run its course may also prevent the rheumatic infection from reaching the heart. It is also possible that by treating a child with nirvanol during its first attack, relapses may be largely avoided. More prolonged investigations are

FIG. 4.



Blood counts, temperature, and pulse-charts of Case 4.

necessary before these points can be decided. Should the ultimate prognosis of chorea after nirvanol prove more favourable than it is with our present modes of treatment, then the drug indeed would have been a valuable discovery. Finally, we might add that in two further cases, under our care, rheumatic nodules of long standing disappeared rapidly after a course of nirvanol.

We are greatly indebted to Dr. P. O. Ellison, Dr. Alan Moncrieff, and Dr. G. W. Goodhart for the blood counts of our cases, and for the interest they have taken in this new form of treatment.

References.

1. Leichtentritt, B., Lengsfeld, W., and Silberberg, M.: Jahrb. f. Kinderheil., 1928, cxxii., 12.
2. Keller, L.: Deut. Med. Woch., 1928, liv., 1880.
3. Huber, H. G.: Med. Welt, 1928, ii., 1609.
4. Schmal, S.: Deut. Med. Woch., 1925, li., 1439.
5. Rudder de: Therapie der Gegenwart, 1928, lxix., 170.
6. Blackfan, K. D., and Hamilton, Bengt: Bull. Johns Hopkins, 1927, xli., 322.
7. Pilz, K.: Arch. f. Kinderh., 1927, lxxxii., 210.
8. Roeder, F.: Ther. Monatschr., 1919, xxxiii., 54.
9. Rietschel: Münch. Med. Woch., 1921, lxviii., 160.
10. Hefter, E.: Zeit. f. Kinderheil., 1924, xxxviii., 403.
11. Husler, J.: Ibid., 1924, xxxviii., 408.
12. Matzdorff, K.: Deut. Med. Woch., 1926, lii., 528.
13. Bendix: Med. Welt, 1928, ii., 328.

ASTHMA AND HAY-FEVER.

By J. E. R. McDONAGH, F.R.C.S. Eng.

Asthma and hay-fever are mild forms of shock affecting the respiratory system, and their nature does not differ from that of shock occurring elsewhere in the body. Shock depends generally upon two factors: (1) a precipitation of colloid protein particles in the vessels of the organ involved, and (2) a loss to the organ of oxygenated blood. In the respiratory tract shock is caused by a precipitation of colloid protein particles in the lymphatic spaces and capillaries, and to a lesser extent in the narrowed arterioles and arteries. The particles become precipitated when they increase in size, absorb water, and undergo agglutination. This change is termed hydration, and is brought about by any agent which will lower their surface tension to a minimum, such as histamine, nicotine, urecoline, coniine, insulin, unprotected colloid, and aluminium or ferric hydroxide. The removal from the tissues of the corpuscular components of the blood causes an immediate reduction in the activity of the tissues. This results in a relaxation of the peribronchial muscular tissue, so that the bronchioles are not constricted. In opposition to current views, I maintain that constriction of the bronchioles does not occur in the most severe form of pulmonary shock, the important feature of the condition being the relaxation of the muscles. The vagus plays little or no part in the actual causation of asthma and hay-fever. Less severe hydration causes the corpusclar elements to collect in the branches of the pulmonary artery, where the cells and tissues are stimulated and deprived of oxygenated blood. The venous congestion attracts polymorphonuclear leucocytes, which break up the hydrated particles into smaller particles. This inflammation, though it relieves the condition of asthma, may lead to broncho-pneumonia or any kind of infection of the respiratory system. Palliative drugs disperse the symptoms by breaking up the protein particles into particles bearing an adequate negative charge. If an excessive number of the particles resulting from dispersion bear a diminished negative charge, thrombosis occurs, but usually most of the particles leave the colloid state to go into true solution. This change is termed dehydration, and the increased flow of blood in the vessels changes the dyspnœa to the inspiratory type.

The action of adrenalin on asthma is not to stimulate the sympathetic nervous system, but to disperse the hydrated particles, through its negatively charged aliphatic methyl group and its negatively charged phenolic hydroxyl group. It is harmful if used over a long period because of the interstitial changes which it brings about in the mesenchymatous tissue, which in the end cause hydration of the protein particles in the plasma as a cyclical change. Much better results, without these harmful effects, are obtained from strontium aspartate, calcium oleate, camphor, acetyl-choline, and choline, which are conductors; and oxygen, which is a dehydrator. Atropine, because of the large size of its nucleus, exerts an initial hydrator effect on the protein particles, and dehydration only occurs later by reason of its negatively charged active groups. It therefore aggravates certain cases of asthma. This property has escaped general recognition, doubtless because atropine is wrongly thought to have a direct action upon the vagus.

The Cause of the Attack.

Any hydrator may precipitate an attack of asthma and hay-fever, especially in persons whose protein particles have already been partly hydrated. The precipitating factor, the foreign protein, may increase the hypersensitiveness, but to remove it does not get rid of the primary cause of the hydration. This explains why cutaneous tests are valueless, and the removal of feathers and other sources of foreign protein from the surroundings only a palliative. An important hydrating factor is a combination of the sun's rays and muscular exercise; this is why hay-fever is most common in summer, and why asthma is so apt to occur in September. The prime cause of hydration is, however, inherited chronic intestinal intoxication, to which focal sepsis of all kinds is secondary. The initial hydration or state of hypersensitiveness is caused by the entrance into the blood stream of poisonous products of digestion. These are manufactured by mutation forms of the normal *Bacillus coli communis*, and consist of foodstuffs altered physically rather than chemically. The hydrated protein particles collect in the walls of the large intestine, to aggravate the condition first by stimulating and then by paralysing the nerve-endings of the vagus in Auerbach's plexus. This produces a hyper-activity, and later a hypo-activity, of the centre of the vagus in the brain, and finally of the cerebral cortex. Incoördination is produced, and intestinal stasis is aggravated, so that the result is a vicious circle. Hydration can be transmitted by both parents, and asthma and hay-fever are therefore symptoms of hereditary disease.

Treatment.

Asthma and hay-fever cannot be cured until inherited disease is eliminated. The treatment resolves itself into removing, as far as possible, the chronic intestinal intoxication, in coördinating the individual, and in correcting the abnormal chemico-physical state of the protein particles.

Removal of the chronic intestinal intoxication is best achieved by washing out the colon as far back as the ileocæcal valve by the syphon method, by having the bowels opened two or three times a day ever afterwards, by avoiding animal food as far as possible, and in particular butcher's meat, eggs, and milk in large quantities, and by immunising the patient against the pathogenic micro-organisms found in the excreta. While the ascending colon and cæcum are being washed out, drugs may be incorporated in the fluid, as absorption readily takes place through this part of the large intestine. The best aperients to use are taxol, and some preparation of liquid paraffin. The manner in which the food is cooked forms 50 per cent. of the problem of diet.

The actual treatment of an attack of asthma depends in the main upon whether the attacks recur at long or short intervals and upon whether they are taken at their inception or later. Patients who have continuous asthma and signs of interstitial pneumonia do best with iodine, thyroid, and ichthyol or thiol-amino-methyl-glyoxaline, prescribed internally, and with small and repeated doses of the carbon di-sulphide product of di-ethyl-amine (contramine) injected intramuscularly. Patients who get an attack now and again should receive two intramuscular injections either of sup. 36 (0·01 g.) or of B.N. 368 (benzoyl-para-amino-benzoyl-3-6-8-hydroxy-naphthylamine: 0·005–0·01 g.), on two successive days. This is the best treatment in cases of hay-fever, because both asthma and hay-fever are most frequently occasioned by the hydration undergone by certain protein particles in the plasma through the dehydration of other protein particles. Both the compounds function as conductors; they correct the dehydration and cause dispersion of the recently hydrated protein particles. Provided an attack of asthma is treated at its inception and a case of hay-fever at the beginning of the season, the attack may be cut short and the next warded off for months, in some cases for years, while hay fever can be checked for the season and one or more ensuing seasons. I have had several cases each of asthma and hay-fever where the timely use of sup. 36 or B.N. 368 checked the attack instantaneously and prevented its recurrence, while the treatment of the primary cause was being carried out. When the hydration is well advanced pure conductors are useless for causing dispersion, and only simple dehydrators and conductors with a dehydrator action can be employed. Dehydrators need to be used

with caution, because the ultimate result of using too large or too many injections is itself hydration, the state responsible for the attack. Therefore I use dehydrators having the minimum hydrator effect and those which possess a conductor action as well. Choline and acetyl-choline are useful at first, but they usually fail when re-employed. Strontium aspartate in 0·01 g. doses, injected intramuscularly every day or every other day, is a most useful drug in the less severe attacks, and is to be preferred to adrenalin. In some of the more severe cases, even when combined with oxygen subcutaneously, the drug may fail to cause dispersion of the hydrated particles. In some cases no known drug is able to correct the abnormal chemico-physical changes, and the attack has to run its course until the hydrated protein particles undergo the cyclical change of dispersion. Peptone, advocated by Auld,[3] [4] acts by causing dispersion of the hydrated protein particles and, being a derivative of protein, its action is essentially homœopathic. It must be used with caution, because a reaction (hydration) causes a serious aggravation of the trouble. Peptone does not cure asthma and hay-fever and, although its initial use may check an attack, it often fails to act a second time. Heroin is the most efficacious hypnotic in asthma, because the two acetyl groups cause dispersion of the hydrated protein particles. The greatest caution is necessary, because of all the condensed nuclei of benzene its vehicle phenanthrene is the one which causes the maximum degree of protein hydration. These methods have proved successful in a large number of cases, the end-result varying chiefly with the stage to which the chronic hydration had progressed and with the condition of the patient.

Illustrative Cases.

CASE 1.—A boy, aged 7, had had asthma every night for six months. The attacks were aggravated by active exercise. The mother and father had been operated upon for appendicitis and the mother's brother is Case 4. The patient had cyclical vomiting as an infant, hay-fever every year, and nocturnal enuresis occasionally. The teeth were bad and the hands were covered with warts. The urine gave an intense reaction with the hydrochloride of di-methyl-para-amino-benzaldehyde. Blood examination was as follows:—

Suspension stability of the red blood corpuscles	0·1 c.cm.
Refractive index of the serum	1·3473
Percentage of blood-sugar	0·137 g.
Percentage of blood-urea	16 mg.

Ultra-microscopic picture: Many particles moving with many large and refractile giant particles, ringed particles, and giant particled clumps precipitated.

Bacteriological examination of the excreta: 10 per cent. atypical *Bacillus proteus hydrophilus.*

Treatment.—Patient was dieted, made to have the bowels open two to three times a day, was given a course of treacle enemas till colon was clear, and had injections of the fæcal vaccine in doses of 125,000. The patient recovered completely; two injections of sup. 36 (0·005 g.) stopped the asthma at once.

CASE 2.—A girl, aged 9, had suffered from asthma since birth. Maternal grandfather and grandmother died of cancer; father suffered from hay-fever and his mother and brother were chronic asthmatics. Patient had one brother and two sisters; the brother suffered from asthma and the sisters from urticaria and epilepsy respectively. Blood examination was as follows:—

Suspension stability of the red blood corpuscles	0·7 c.cm.
Refractive index of the serum	1·3489
Percentage of blood-sugar	0·112 g.
Percentage of blood-urea	41 mg.

Ultra-microscopic picture: Many particles moving with a fair number of giant particles, all of which had a halo around and were very refractile. The other particles moved very actively around the giant particles. There were some clumps and agglutinations precipitated.

Bacteriological examination of the excreta: 20 per cent. *Bacillus fæcalis alkaligenes.*

Treatment.—Patient was dieted, made to have the bowels open two to three times a day, was given a course of treacle enemas till colon was clean, and had injections of the fæcal vaccine in doses of 250,000. The patient recovered completely.

CASE 3.—A woman, aged 28, who used to suffer from asthma and chronic bronchitis as a child, sought advice for constant abdominal pain. The patient had had attacks of rheumatic fever and was supposed to have had typhoid fever and paratyphoid. She had suffered from seborrhœa and acne vulgaris, and had once been jaundiced. The patient was always depressed; she suffered severely from dysmenorrhœa, and was in every way a typical example of familial chronic intestinal intoxication. Blood examination was as follows:—

Suspension stability of the red blood corpuscles	0·3 c.cm.
Refractive index of the serum	1·3502
Percentage of blood-sugar	0·118 g.
Percentage of blood-urea	18 mg.

Ultra-microscopic picture: Fair number of particles moving with some very refractile giant particles and ringed particles. There were many giant particles, clumps, and agglutinations precipitated, with some precipitated en masse.

Bacteriological examination of the excreta: 60 per cent. Morgan bacillus.

Treatment.—Patient was treated in the routine way and recovered completely. This case shows that in spite of the asthma and bronchitis disappearing other signs and symptoms, the result of protein hydration, presented themselves.

CASE 4.—A man, aged 33, had had asthma for 14 years; eating eggs and having anything to do with rabbits brought on an attack immediately and the smell of petrol frequently precipitated an attack. The patient was the uncle of Case 1. The patient suffered from chronic bronchitis as a child, had had two attacks of rheumatic fever, and had been afflicted with acne vulgaris for many years. The optic discs were mal-developed, the ears were prominent, the elbows were wide-angled and hyperextended, and the patient could not stand with his feet and knees together. All the molars had been stopped or removed; the tongue was furred and the patient had acro-asphyxia. The pulse was 80 and the blood pressures registered 105 and 70 mm. Hg respectively. An examination of the abdomen revealed tenderness in both hypochondria and both iliac fossæ. The urine gave an intense reaction with the hydrochloride of di-methyl-para-amino-benzaldehyde. Blood examination was as follows:—

Suspension stability of the red blood corpuscles	1·2 c.cm.
Refractive index of the serum	1·3487
Percentage of blood-sugar	0·062 g.
Percentage of blood-urea	39 mg.

Ultra-microscopic picture: Few particles moving with some giant particles and ringed particles. There were more particles precipitated as giant particles, ringed particles, and clumps. The precipitation amounted almost to precipitation en masse.

Bacteriological examination of the excreta: 20 per cent. *Bacillus proteus valeriei.*

Treatment.—Butcher's meat, eggs, and milk were excluded from the diet; the colon was washed out; the attack which the patient had at the time of examination was checked with two injections of B.N. 368 (0·005 g.), and later four injections of the fæcal vaccine were prescribed in two courses of two in a half and one million respectively. The patient had had a course of peptone injections without benefit. He recovered completely and was able to resume his occupation as a motor mechanic.

Summary.

Asthma and hay-fever are symptoms of inherited disease caused by the precipitation of hydrated protein particles and by the lack of oxygenated blood in the respiratory tract. The chief signs and symptoms of inherited disease are mal-coördination and a chronic intestinal intoxication. Asthma and hay-fever can usually be prevented by correcting the mal-coördination and removing the chronic intestinal intoxication.

Asthma and hay-fever are not diseases. Asthma is not caused by a stimulation of the vagus occasioning a constriction of the bronchioles. When adrenalin palliates an attack it does so by causing the hydrated protein particles to disperse, not by stimulating the sympathetic nervous system.

Asthma and hay-fever can usually be overcome with drugs able to cause dispersion of the hydrated protein particles. These measures are really no more than palliative, and a "cure" can result only in the prevention of inherited disease.

Bibliography.

1. McDonagh (1924): The Nature of Disease. W. Heinemann.
2. McDonagh (1927): Ibid.
3. Auld: Brit. Med. Jour., 1924, ii., 575.
4. Auld: Ibid., 1925, i., 448.

ANTIDYSENTERY BACTERIOPHAGE IN THE TREATMENT OF BACILLARY DYSENTERY.

A RECORD OF SIXTY-SIX CASES TREATED, WITH INFERENCES.

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DYSENTERY is one of the three most fatal infectious diseases of the urban population of Egypt. The official figures for Alexandria for 1927 and 1928 show on a mean population of 579,485 a death-rate from tuberculosis of 1, from diphtheria of 0·3, and from dysentery of 0·2 per thousand; but for the five years 1924–28, in an average population of 560,218, the total deaths registered from these three diseases were: tuberculosis 3532, dysentery 844, and diphtheria 572. This gives over the longer period a mean yearly dysentery death-rate of 0·3 per thousand. Of these deaths the majority must be put down to bacillary dysentery; first, because, judging by the laboratory diagnosis of specimens, this is far the more prevalent form of the disease,* and secondly because more specific and satisfactory therapeutic measures (emetine, yatren) have hitherto been available for the treatment of amœbic cases.

When I took up my duties in Alexandria in 1926 I found that the serum treatment of bacillary dysentery had largely fallen into disuse as inefficacious and that many cases of bacillary dysentery were, in my opinion, being erroneously diagnosed and treated as amœbic. This meant that before 1927 many, perhaps most, bacillary dysentery cases in the district, received no specific treatment whatever. Can the impressive fall in death-rate for the years 1927 and 1928 be accounted for by the institution of a relative amount of specific treatment, or must it be passed over as something incalculable, although it represents an economy of close upon 100 lives per year? I believe that it is related to the use during those two years of antidysentery bacteriophage for the treatment of a certain proportion of the bacillary dysentery cases in the district. Towards the middle of 1927 I began preparing and distributing gratuitously antidysentery bacteriophage for therapeutic use to doctors in the city who were willing to coöperate in an endeavour to obtain information on the value of this treatment. The distribution was limited to cases which had been diagnosed cytologically in these laboratories as bacillary dysentery. Opinion then was, and to a large extent still is, divided as to the therapeutic merits of bacteriophage.

d'Herelle (1926[1]), guided by the bacteriolytic property of bacteriophage which he had established in vitro, inaugurated this treatment in 1921 on five cases of Shiga dysentery. The results were excellent: the bloody stools ceased within 24 hours in each case and the patients entered upon immediate convalescence. Enthusiasm, however, shortly afterwards waned. Otto and Munter (1921) in Germany, Davidson (1922) in America, and Fletcher and Kanagarayer (1928) in the Malay States recorded essentially negative results. Against this Da Costa Cruz (1924) in Rio de Janeiro, after an initial series of poor results, finally established uniform success, and thereby confirmed d'Herelle's original observations. This was the situation when the present investigation was begun and throughout its progress.

Phage Employed: Its Preparation and Distribution.

The therapeutic phage distributed was of multiple origin and polyvalent quality. It consisted initially of four phage-strains: one passed to me by d'Herelle and three others isolated by me in Egypt. The mixture was put up against 16-hour broth-cultures of some 12 *local* strains of dysentery bacilli: two Shiga, three Flexner, six Hiss (including one Sonne), and one Gay. Hiss type constitute the predominating organism in the Alexandria region. Complete lysis of the cultures occurred after a few hours in the incubator at 37° C. After 24 hours' incubation the lysates were mixed and filtered through a filter impregnated with infusorial earth, and later through a L3 Chamberland filter. The filtrate constituted the therapeutic phage. It was transferred to sterile ampoules in quantities of approximately 2 c.cm. Three ampoules were, as a rule, distributed to each patient undergoing treatment, with a circular instructing the patient on the use of the phage and a questionaire to the doctor, to be filled up and returned to the laboratory later. Nearly 200 cases received treatment, about 50 in 1927 and 150 in 1928, and circulars were returned from 92 cases. Of these, only 66 were full enough to use.

The remaining cases from whom no returns were received have, I consider, to be reckoned for the most part as "cures," since had they been "failures" they would have reported again at the consulting-rooms of their medical attendants. As they were mostly poor and left no addresses, they could not be satisfactorily followed up. But providing them with phage probably meant to a certain extent the dissemination of antidysentery phage in their surroundings, a factor to which d'Herelle has attached some importance, since he holds that "immunity by phage, like the disease itself, is infectious."

Clinical Results.

For simplicity of interpretation and ease of reference, the results arrived at are classified in a general way, as follows:—

+ + + = Very good = Stools reduced to 2–3 per day by the 2nd day (counting the initial day as 0), in conjunction with improvement in the general condition of the patient.

+ + = Good = (Stools reduced to 3–4 per day by the 3rd day, or Stools reduced to 3 per day by the 4th day) with improved general condition.

+ = Moderately good = Stools reduced to 4–5 per day by 5th day.

(+) = Partial failure = Little or no change in the number of stools or in the general condition within 4 days, but ultimate recovery.

— = Failure = Death, or no change within 1 week of commencing treatment.

When anti-serum treatment was first being tried two factors were mainly relied upon as criteria of cure: (1) lowering of mortality, and (2) diminution in the duration of the disease, compared with the recognised slowness of cure when drug treatment only was available. Thus, Kolle and Hetsch (1918) record that the nervous symptoms diminished, the patient's strength returned, the colic and tenesmus ceased, while blood and mucus gradually disappeared from the stools, which in 2–5 days regained their normal composition. In many cases, however, progress was not so rapid. Dopter and Saquepée (1921) observe that the number of stools became lowered to 8–10 in 24 hours, to remain stationary at this level for many days. All authors have noted that when serum-therapy was instituted late it seemed to have no effect. This applies to a certain extent also to phage-therapy, as a badly eroded intestine naturally cannot return all of a sudden to its status quo ante.

The result of phage was "very good" in 35 of our 66 cases, "good" in 10, "moderately good" in 6, a "partial failure" in 5, and a "failure" in 10. Two cases, however, had been ill a fortnight and were practically dying at the moment of the phage intervention. This was presumably true also in a third fatal case in which the date of onset was unknown. One patient was ill about two months before the phage was given, and naturally an immediate cure was out of the question, in view of the intestinal lesions present. Eliminating these four cases, the failures are reduced to six. On

* Our statistics indicate that 80–90 per cent. of all dysenteries in Alexandria are bacillary. The records of the Public Health Laboratories, Cairo, indicate a similar state of affairs. (See Perry and Benstead, 1928.)

the severest possible analysis, grouping these 6 "failures," the 5 "partial failures," and the 6 "moderately good" results together as failures, we have in all 17 failures and 45 successes on a total of 62 cases. This represents a minimum percentage success for the treatment of 72·6. Of the failures, three had been ill for a week—maybe more—before the phage treatment was begun; two of them were children less than one year old. Both early intervention and the age of the patient play an important rôle in the success of the treatment.

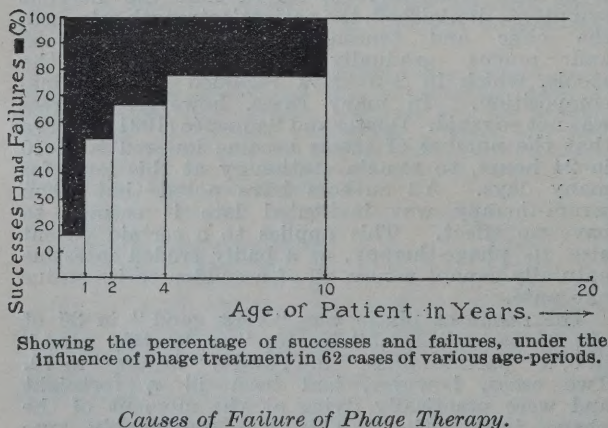
In five cases anti-serum treatment was employed in addition—an unintentional experiment, since it was no part of my idea that serum should be used—it was administered independently by the treating physician. Three of these figure as failures and two as successes. Of the three failures, one had the serum before and two after the phage, while the two successes had the anti-serum before the phage. If any conclusion is justified by these cases it is, I think, that there is no contra-indication to phage when the patient has already had serum. The two successes are interpreted rightly or wrongly, as solely due to the phage. This interpretation is, I think, justified by the clinical notes. Moreover, all authorities are agreed that for antidysentery serum to be of any use it must be given in large doses, and not in the 10 c.cm. doses generally used here.

It is well known that certain cases of bacillary dysentery do well on saline treatment alone, or even on emetine, but this does not invalidate the successes attributed to phage, because it is a well-established fact that many patients develop phage spontaneously. One case is particularly interesting.

A specimen of fæces, collected on the fourth day of illness, just before the administration of the first dose of therapeutic phage, was found to be rich in a phage with the following activities: Shiga +++, Flexner ++, Hiss +++, Paracolon No. 2+++. Yet clinical improvement only dated from the administration of the therapeutic phage. The particular therapeutic phage used in this case possessed activities which were slightly different—i.e., Shiga+++, Flexner+++, Hiss++, Paracolon No. 2−.

This is obviously a patient who would eventually have recovered of his own accord. The therapeutic phage by mouth merely accelerated the cure and constituted the "reinforcements" necessary to ensure a rapid phage "victory" in the phage-bacterial engagement already going on in the patient's intestines. From this and other considerations I have not the slightest doubt that the spontaneous development of phage will explain most of the bacillary dysentery "cures" due to emetine and simple saline treatment.

FIG. 1.



Showing the percentage of successes and failures, under the influence of phage treatment in 62 cases of various age-periods.

Causes of Failure of Phage Therapy.

Three factors exert an influence on the success or failure of the treatment: the age of the patient, the number of days' illness before the phage intervention, and the bacterial flora. The 62 cases arrange themselves in terms of success and failure as set out in Table I.

These numbers are represented diagrammatically in Fig. 1.

TABLE I.

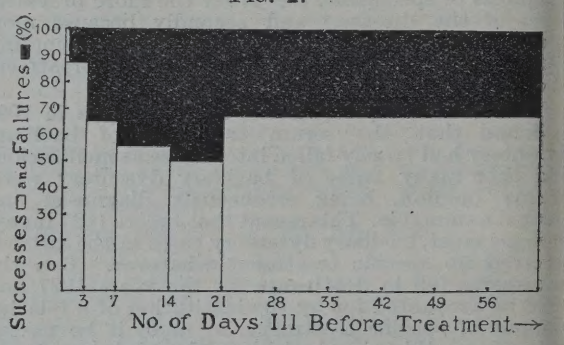
Age.	Number of cases.	Percentage.	
		Successes.	Failures.
Under 1 year	6	16·7	83·3
Between 1 and 2 years ..	15	53·3	46·7
„ 2 and 4 „ ..	9	66·7	33·3
„ 4 and 10 „ ..	9	77·8	22·2
From 10 years upwards ..	23	100·0	0

The phage treatment was least successful with children under 1 year old. It was three times as successful with children between 1 and 2, four times better with children between 2 and 4, and still more successful with children between 4 and 10, to reach complete success with adults.

Table II. sets out the arrangement in time-periods of the 62 cases in which definite information was obtained of the number of days of illness before phage treatment.

These numbers, represented diagrammatically, give Fig. 2.

FIG. 2.



Showing the percentage of successes and failures of phage-therapy in dysentery, in terms of the number of days patient was ill before the intervention with phage.

TABLE II.

Days ill.	Cases.	Percentage.	
		Successes.	Failures.
1–3 ..	15·5	87·1	12·9
3–7 ..	27	64·8	35·2
7–14 ..	13·5	55·5	44·4
14–21 ..	3	50	50
21–60 ..	3	66·7	33·3

The success of treatment varies inversely as the number of days the patient was ill before it was commenced. Thus, if the patient had been ill for three days or less about 90 per cent. success was obtained, while when treatment was delayed until the fourth to seventh day the success was about 65 per cent. When treatment was commenced one to two weeks after onset, a success of 55 per cent. only was reached; when it was delayed for three weeks, a fifty-fifty result was obtained. Beyond three weeks, and up to two months, the diagram records a certain improvement in the percentage of successes. The need for early intervention therefore is established. It might be better not to wait for a preliminary purging but to administer the phage at once and to give salines afterwards. There is one instructive case in the series which was treated very successfully in this way.

If the microbes causing the intestinal lesions are not attacked by the phage, obviously no good can be expected from its administration. Cultural studies were made of the majority of the cases but only in six was the flora completely determined before and after phage administration. Two were

successful phage-therapy cases, two were immediate failures, and two were complete failures. They are summarised in Table III.

TABLE III.—*Bacterial Flora Before and After Phage in Six Cases.*

Case.	Age in years.	Days ill before phage administered.	Bacterial flora (as isolated on Endo's medium).		Result of treatment.
			Before treatment.	After treatment.	
2	8/12	7	Coliform only.	Two atypical *B. dys.* (Gay) types.	—
25	2½	4	*B. proteus* No. 2.	*B. proteus* No. 2, *B. proteus* No. 3, *B. paracolon* No.1, and a *B.meta-dys.* (unknown).	−
27	3	3 (1)*	*B. proteus* No. 2.	*B.C.L.A.* No. 2 or 5, *B. lactis aerogenes.*	+
33	4	1	*B. dys.* (Sonne) *B. paracolon* No. 1.	*B. lactis aerogenes*, and an unknown bacillus of the dysentery group (*a*).	+++
35	5	3 (1)*	*B. proteus* No. 2.	*B. morgan* No. 1, *B. lactis aerogenes*, an atypical *B. dys.* (Gay), and a *B. meta-dys.* (unknown).	+
40	6	2	*B. dys.* (Hiss)	Coliform only.	+++

* Third day ill, but first day of "blood and mucus" in stools. The cases were sister and brother respectively.
(*a*) Fermenting glucose, maltose, and saccharose, but not mannite or dulcite.

The two cases (Nos. 33 and 40) which did well on phage-therapy had classical *B. dysenteriæ* (Sonne and Hiss respectively) present in the stools before the administration of phage, while, after phage administration, these organisms could not be recovered on culture from the stools: in the one case 36 hours after commencing the treatment, and in the other on the fourth day. *B. proteus* No. 2 is practically constant in the failure cases. This is very striking. Its absence, before and after, in the successful cases is equally noteworthy. It suggests, I think, the need for the revision of our ideas concerning the rôle of *proteus* organisms in the summer diarrhœas of children and the bacillary dysenteries of adults. Most authors consider them rather as concomitants. I suggest that the presence of *proteus* organisms, more especially *B. proteus* No. 2, constitutes an ætiological factor of considerable importance in bacillary dysentery, particularly in children. This organism only differs from *B. morgani* No. 1, so frequently found in summer diarrhœa, by liquefaction of gelatin and by failure to produce indol. It is, I think, chiefly because of its presence that the results of phage-therapy were so disappointing in the cases under two years old. To combat *proteus* organisms by phage-therapy is fraught with difficulty, because the *proteus* group of bacteria is not homogeneous, as is the dysentery group, in its susceptibility to phage action; and because *proteus* organisms are rich in specific endotoxins, allied to botulinus toxin though less powerful. There is, therefore, no guarantee that a phage active against a *B. proteus* causing trouble in one intestinal tract will be active against the *B. proteus* of another case. Moreover, lysis in vitro of the bacterial bodies of *proteus* organisms, by liberating their contained toxins which pass into the filtrate, may render such a liquid too toxic for immediate therapeutic use.

d'Herelle (1926[2]) records having isolated two races of bacteriophage which, at the moment of their isolation from the stools of two infants who had died of infantile cholera, were very virulent for *B. proteus vulgaris*, yet of 12 strains of *B. proteus* only three were found susceptible, and they were the same for each of the two races. Again, he found the filtrate from a bacteriophaged suspension of *B. proteus vulgaris* was extremely toxic for rabbits immediately after the dissolution of the bacilli (0·5 c.cm. subcutaneously causing death within a few hours). When kept, however, for 10 days the toxicity had diminished, the rabbit then surviving the intravenous injection of 2 c.cm.

Summary.

The general result of phage treatment for bacillary dysentery appears very much in its favour: 70 per cent. of the cases showed a well-defined response and rapid improvement. The good effect was the more marked the earlier the treatment was begun; it was relatively less favourable the younger the patient. It was particularly successful in patients aged 10 years and upwards. Cases with *proteus* group organisms —especially *B. proteus* No. 2—in the intestinal flora did not do so well.

Incidentally, during the progress of the treatment and side by side with it, a noteworthy lowering in death-rates from dysentery was recorded. Whether this is a simple coincidence, or affords evidence of a cause-and-effect relationship, it is not at present possible to affirm. During the investigation there undoubtedly occurred a certain dissemination of the living ultra-virus *Protobios bacteriophagus dysenteriæ* in the surroundings of the patients, with a probable dissemination of natural protection. Distribution of phage to patients in a region means an increased proportion of phage "carriers" among the population, with, in all probability, a correspondingly increased distribution of phage to food and drink. Here doubtless the fly—the great distributor of dysentery bacteria in nature —may reasonably be assumed to play a rôle.

My best thanks are due to the many colleagues—representatives of the Air Forces, the Army, and the civil practitioners in Alexandria, too numerous for individual mention—who kindly collaborated with me in this investigation.

References.

Da Costa Cruz, J.: Compt. rend. Soc. de Biol., 1924, xci., 845.
Davidson, W. C.: Amer. Jour. Dis. Child., 1922, xxiii., 531.
d'Herelle, F.: The Bacteriophage and Its Behaviour, Trans. by G. H. Smith, Baltimore, 1926, p. 439; ibid., p. 257.
Dopter, C., and Saquepée: Précis de Bactériologie, Paris, 1921, p. 575.
Fletcher, W., and Kanagarayer, K.: Bull. Inst. Med. Res., Kuala Lumpur, 1927, No. 3; see THE LANCET, 1927, ii., 402.
Kolle, W., and Hetsch, H.: La Bactériologie Expérimentale. Geneva, 1918, p. 329.
Otto, R., and Munter, H.: Deut. Med. Woch., 1921, xlvii., 1579.
Perry, H. M., and Benstead, H. J.: Trans. Roy. Soc. Trop. Med. and Hyg. 1928, xxi., 417.

Clinical and Laboratory Notes.

A SIMPLIFICATION OF THE "HALO" METHOD OF MEASURING THE DIAMETER OF RED BLOOD CORPUSCLES.

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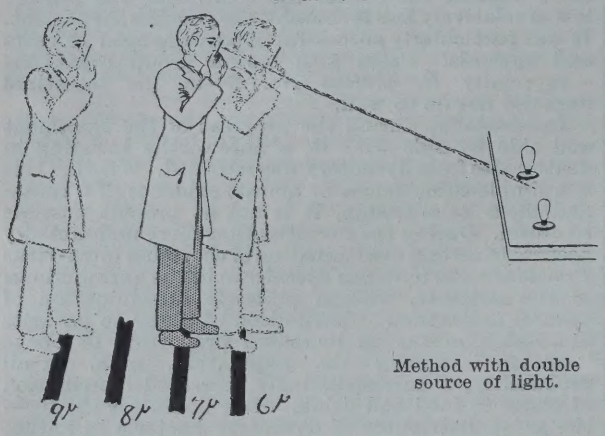
THIS optical method was introduced into hæmatology by Pijper [1] [2] and, as the "diffraction method," has been brought by him to a high state of perfection. In his last paper,[2] in which the theory is fully discussed, a method is given by which the patient's blood can be examined at the same time as the normal. It has, however, been suggested in this journal[3] that, on account of the elaborate nature of the apparatus required, the general application of the method is somewhat limited. The purpose of the present communication is to describe two methods in which the necessary apparatus is reduced to a minimum.

First Method.

The observer looks through a blood-film at two electric lamps placed about two feet apart at right angles to the line of sight. Two "halos" are seen, each consisting of a number of concentric spectra. The apparent size of these two "halos" is dependent on the distance from the twin source of light. They appear to become smaller on stepping forwards, and to become larger on stepping backwards. In this way any pair of corresponding coloured rings in the two

"halos" can be made to meet, overlap, or separate. The distance at which contact is made between a selected pair of corresponding rings is directly proportional to the diameter of the red blood corpuscles. The coloured ring which is easiest to use is the red fringe of the innermost complete spectrum (Spectrum of first order).

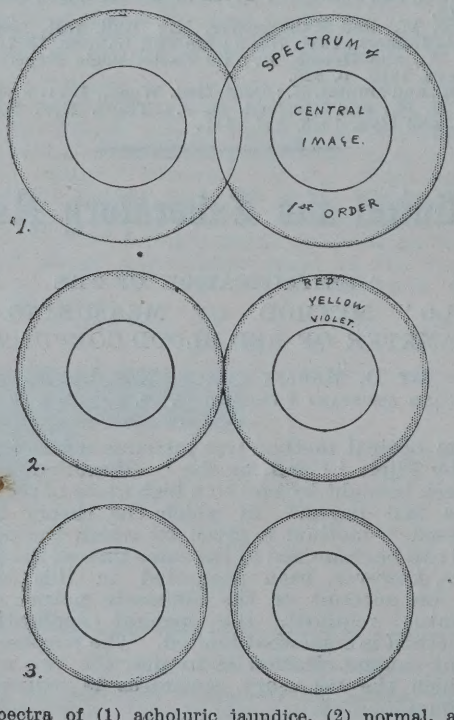
FIG. 1.



Method with double source of light.

The patient's blood-film is examined at the position of contact for the normal. Any difference in the size of the "halos" is shown by overlapping or separation of the selected diffraction rings (see Fig. 2). For example, in pernicious anæmia the "halos" are obviously smaller, and it is necessary to step back a distance which is proportional to the increase in the size of the red corpuscles. If the method is adopted as a routine the floor may be calibrated with chalk lines, so that one foot corresponds to 1 μ. This is done by adjusting the distance between the lamps so that, with normal blood-films, apparent contact is made at a distance of 7 feet. They will then be about 2 feet 4 inches apart.

FIG. 2.



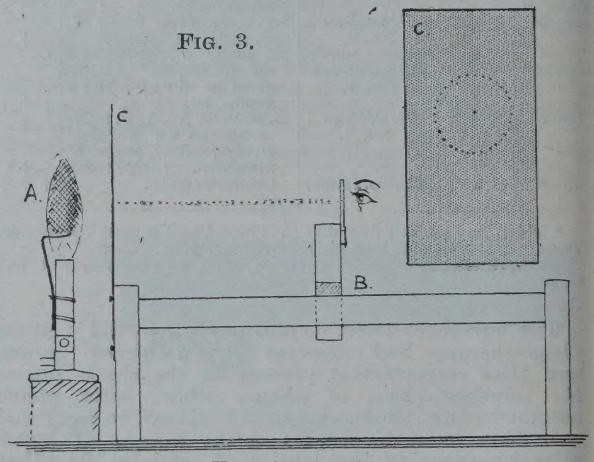
Twin spectra of (1) acholuric jaundice, (2) normal, and (3) pernicious anæmia blood-films at position of contact for the normal.

This method requires no special apparatus, is quite sufficient for diagnostic purposes, and could easily be used by the general practitioner in his ordinary consulting room.

Second Method.

This method, devised by Thomas Young (1773–1829) and described in text-books of physics under the heading of Young's eriometer,[4] is admirably suited to the present purpose. The apparatus required, which is easily constructed, consists of: (A) A source of light (sodium flame or electric lamp). (B) Optical bench with rider for carrying blood-film. (C) Metal plate with a central aperture 1–2 mm. in diameter, surrounded by a ring of 2 cm. radius, of pin-point holes. (The measurements are, of course, arbitrary.)

FIG. 3.



Young's eriometer.

A dark room is necessary when using sodium light, but is not essential for white light. On looking through the blood-film, diffraction rings are seen around the central aperture in C, whilst the ring of holes appears as a circle of luminous points. The film is moved about until apparent coincidence is obtained between the circle of luminous points and a selected diffraction ring (say the yellow of the spectrum of the first order). The distance of the film from the metal plate at which this takes place varies directly as the diameter of the red corpuscles. Since the diameter of the normal corpuscles is known, that of the patient's corpuscles can be calculated by simple proportion. With sodium light, concentric yellow rings are seen instead of spectra. Readings are taken for both borders of a selected ring (say the first). The difference and the mean correspond with the anisocytosis and average size respectively.

My thanks are due to Dr. Wilfrid Newcomb and Mr. Leslie Paton for their kind and valuable advice.

References.—(1) Pijper, Adrianus: THE LANCET, 1924, ii., 367. (2) Pijper, Adrianus: Brit. Med. Jour., 1929, i., 635. (3) THE LANCET, 1929, i., 1261. (4) Preston, T.: Theory of Light, 4th ed., p. 234.

A CASE OF LOBAR PNEUMONIA IN A CHILD.

BY KENNETH MCFADYEAN, M.R.C.S. ENG.

THE following case seems to be worth recording because it illustrates some of the difficulties of diagnosing pneumonia in children:—

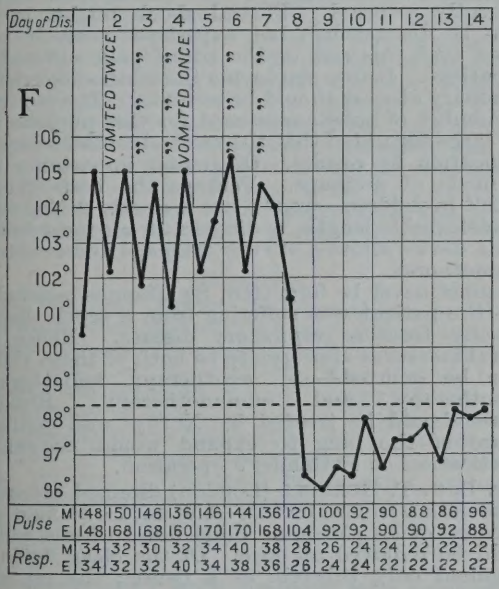
A girl, aged 5½ years, complained of earache on Dec. 5th. On the 6th, in the early afternoon, she said she felt cold, and was put to bed with a temperature of 100° F. She was first seen by me at 8 P.M. on that day, when a diagnosis of lobar pneumonia was made. There were definite alterations in the breath sounds and some crepitations over the lower left lobe, and a few fine crepitations scattered over a small

area inside the right scapula. The right tympanum was inflamed, but this was not considered serious. During the night of the 6th–7th there was a small quantity of blood and straw-coloured discharge from the right ear.

On Dec. 7th a consulting physician saw the child at 9 A.M., and was satisfied that there was nothing abnormal in the chest, but was of the opinion that there was mastoid inflammation. At noon an aural surgeon saw the case. In his opinion the mastoiditis was acute, and was the cause of the child's general condition. He advised surgical interference unless the general condition improved in 24 hours. At 9 P.M. a second consulting physician saw the child and was satisfied that his examination of the chest was negative. He advised surgical treatment of the aural condition. At 10 P.M. a second aural surgeon expressed the opinion that the mastoiditis was slight, and that the case should be watched.

On Dec. 8th the inflammation in the right ear was definitely subsiding. There was very little swelling in the meatal floor, the tympanum was pink, there was no aural discharge, and no perforation was seen. There was no longer tenderness over the mastoid. In the evening the patient complained of occasional severe stabbing pains in the chest over the lower left ribs in the axillary line.

On Dec. 9th a consulting pathologist found a leucocytosis of 22,400 per c.mm., with 77 per cent. polymorphonuclear leucocytes, and expressed the opinion that this "indicates the presence of pus under tension." All signs of inflammation in the ear had subsided. In the afternoon the patient's



condition seemed serious. The signs in the left lower lobe were now well marked. The first consultant, on re-examining the patient's chest, expressed the opinion that possibly the patient had a miliary tuberculosis. Albumin was present in the urine. Subsequent examination showed that the degree of albuminuria varied considerably, and was very severe when the temperature was between 105° and 106°, and at a time when the child was drinking considerable quantities of albumin water.

The treatment of the case as one of pneumonia was instituted at the outset and continued. On Dec. 13th the crisis set in, with definite signs over the left lower lobe. In 24 hours the temperature dropped from 104° to 96°, pulse from 170 to 108, respiration from 36 to 26. The patient made an uneventful recovery.

The case presents some striking features, of which one or more is frequently to be found in cases of infantile lobar pneumonia. These are, firstly, the liability of an error in diagnosis when an acute otitis media is present in the early stages; secondly, the difficulty of making a correct diagnosis when relying solely upon one examination of the chest, made at a particular moment during the illness; thirdly, the possibility of attaching undue weight to the presence of albuminuria in this condition; and lastly, the fallacy of regarding a high leucocytosis as necessarily indicative of pus. One other unusual feature, rarely seen, was the persistent vomiting.

All these features of the case are adequately dealt with by Dr. G. F. Still in his "Common Disorders and Diseases of Childhood."

London, S.E.

A CASE OF
HYPERTHYROIDISM WITH MANIA.
RELIEVED BY OPERATION.

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In his selection of cases for operation Mr. W. H. C. Romanis [1] holds that "in serious mental changes of the melancholic or maniacal type" operation is absolutely contra-indicated. The following case, however, suggests that maniacal symptoms can sometimes be relieved by operation.

Mrs. A. B., aged 42, whose husband was abroad, was brought to consult me in February, 1929.

In 1919 her relations noticed that her eyes were protruding and she was taken to Edinburgh Royal Infirmary where she was advised to have an operation on her thyroid, but refused. Since then she has had gradually increasing ill-health, palpitation, headaches, insomnia, tremor, and marked loss of flesh. In 1921 she was taken to consult a doctor and because of her maniacal symptoms she was certified insane and spent six months in an asylum. Since then, though her general health had improved, she continued to show symptoms of cerebral derangement, writing letters of abuse to her relations, locking herself in her house, and on one occasion trying to set fire to herself. Her family history is negative as regards insanity.

In February, 1929, against her will but with the permission of her relatives, she was admitted to the Dunfermline and West Fife Hospital under my charge. On admission she was quite irrational and her behaviour was that of a maniac. She was under the delusion that her relatives had employed me to get rid of her. There was marked exophthalmos and tremor. The pulse-rate was 120 per minute. The thyroid was symmetrically enlarged with distended and pulsating veins over the front of the gland. Her teeth were in very bad condition but she refused to have them touched. She refused enemata and hypodermic injections, but was persuaded to take Lugol's solution minims x. t.i.d. and luminal at night.

After 15 days in hospital her mental condition was not improved though her pulse-rate had fallen to 84. On the sixteenth day she was taken to the theatre and under open ether a subtotal thyroidectomy was performed. Forty-eight hours after operation she was quite rational. Twenty-two days after operation she was discharged, her condition mentally having undergone a complete alteration. Her pulse-rate was 60 per minute and her tremor had disappeared.

In July, 1929, she reported having had her teeth extracted. She is living now in peace with her relations who state that her mental condition is normal. Her exophthalmos and other physical signs are now gone and she appears to be a sane woman again.

According to Dr. John Eason, these symptoms of mania may be due to: 1. The action of the toxæmia of hyperthyroidism on the cerebral cells (this is not proved). 2. The effect of various cardiovascular disorders characteristic of exophthalmic goitre upon the cerebral circulation. 3. Coincident focal infections causing toxæmia.

If the mental symptoms are due to either (1) or (2) then, as in the present case, operation for the removal of the toxic thyroid gland appears to me to be the proper line of treatment.

[1] THE LANCET, July 20th, p. 113.

WEST KENT JOINT ISOLATION HOSPITAL.—Lord Cornwallis, Chairman of the Kent County Council, last week opened a new administrative building and nurses' hostel at the West Kent Joint Isolation Hospital at Bromley Common, an institution which serves the borough and rural district of Bromley, and the urban districts of Beckenham, Chislehurst, and Sidcup, with an estimated population of 130,000. Each of the 40 nurses has a separate room, and the administrative offices are extensive enough to provide for the needs of the hospital for many years to come.

BRITISH MEDICAL ASSOCIATION.

ANNUAL MEETING IN MANCHESTER.

(*Continued from p. 231.*)

SECTION OF MEDICINE.

TREATMENT OF PLEURITIC EFFUSIONS.

Opening Addresses.

Prof. G. R. MURRAY (Manchester) took the chair at a discussion on this subject opened by Sir THOMAS HORDER. The factors to be considered, he said, were the cause of the infection, the nature and size of the effusion, the stage of the disease, the associated condition of the lung, the degree of illness of the patient, and the contribution made by the effusion, as such, to the illness at the time. The traditional division of effusion into serous and purulent was, he thought, justified. Serous or sero-fibrinous effusions might be tuberculous (primary), rheumatic, influenzal, lymphadenomatous, or neoplastic. They might also perhaps be caused by some other infections besides those mentioned. Purulent effusions (i.e., empyema) might be pneumococcal, streptococcal, staphylococcal, and influenzal (mixed infections), and occasionally gonococcal, coliform, or a result of streptothrix infection. The stage of disease was very important. To remove all effusions on sight was bad practice, whether they were serous or purulent. The associated condition of the lung must be assessed as carefully as possible. Cæteris paribus, active and acute disease of the lung contra-indicated removal of the fluid, since the fluid kept the lung at rest. It was important to decide how far the patient was handicapped by the fluid—whether in toxic or mechanical fashion—and how far he was ill by virtue of his general infection. The more the illness was the result of the general disease, the more carefully and slowly should the effusion be removed.

Most serous effusions, continued Sir Thomas, were tuberculous. If very large, they should be tapped as soon as diagnosed; they should also be tapped if associated with cardiac or respiratory distress. The remainder were tapped if they showed no further signs of absorption after fourteen days from their discovery. Too early interference was meddlesome; too late interference might lead to permanent collapse of lung with chest deformity. The possibility of latent tubercle in the lung must always be borne in mind, and until the case had been properly studied its existence must be assumed. If disease of the lung was established, a conservative policy as regards the effusion was imperative; otherwise there was fear of renewed activity or even pyopneumothorax. Oxygen replacement might be undertaken. Throughout, and afterwards, the patient with no manifest signs of pulmonary disease was treated as though this was present in its early stages. General treatment was instituted; iodine and calcium might be given internally; the arm should be immobilised and the chest strapped on the affected side. In removing serous effusion slow aspiration was probably preferable to syphonage. Injecting drugs into the pleural cavity was of doubtful value, and autoserotherapy had at present too little to its credit to justify more extensive trial. Recurrent effusion might call for the trial of adrenalin or paraffin. Exhaustion by Potain's aspirator must be done carefully and slowly, the last few ounces need not be considered, for they would be rapidly absorbed. A cigarette for the doctor, said Sir Thomas, would give improved results. Local anæsthesia should be effective, and a nick with a sharp scalpel was of considerable value. The ritual of major operations was uncalled for. The volume of fluid removed might require judgment. After-care should be controlled by the tuberculous nature of the disease, and the patient should not return to active life within three months.

Rheumatic effusions were part of an acute and general rheumatic inflammation, carditis being present. Tapping the effusion was rarely necessary. In influenza the effusion was either present with pneumonia—when it should be dealt with palliatively—or followed the acute stage of the disease, when it should give rise to suspicion of tuberculosis.

In empyema, Sir Thomas Horder continued, the surgical maxim, "Evacuate pus as soon as diagnosed," should not be departed from. The time factor was of great importance. The more ill the patient and the more active and extensive the disease in the lung, the more was aspiration indicated and the less was an open method of drainage indicated. One or two aspirations might be all that was necessary, not only in pneumococcal, but also streptococcal disease. When the patient remained very ill, and/or the lung actively diseased, and freer drainage than that given by repeated aspiration nevertheless seemed desirable, trial might be made of incision without resection. As soon as might be, however, the ideal method should be employed—viz., incision with resection of portion of a rib or ribs. Treatment by incision (with or without resection), irrigation, and closure of wound, was successful in some pneumococcal cases, but too often entailed recourse to the open method later to be recommended. It should never be relied upon in streptococcal or staphylococcal cases. Digital exploration at resection operations was of great importance; it broke down adhesions and gave useful information. The question of irrigation of the empyema cavity frequently recurred. Pleural shock might, in the main, be disregarded, but experience scarcely warranted even this risk or the added pain suffered by the patient. Before employing the method coexistent pulmonary abscess should be excluded. The fact that the number of substances used for this purpose was very large suggested that the method lacked adequate justification by results. Of greater importance was the mode of drainage. Perhaps the best—though difficult in children—was to use a closely fitting tube, of considerable length, ending in an air-tight bottle. Such a device allowed of slow drainage and avoided a pneumothorax.

It must never be forgotten, Sir Thomas concluded, that the patient was suffering from a septic disease and also from a respiratory disease. Hence the general measures appropriate to both of these should never be omitted—e.g., ærotherapy, heliotherapy, actinotherapy, and immunotherapy. Residual sinuses should be treated by X rays and sunlight. Failure of the lung to expand would necessitate decortication or Estlander's operation.

Dr. L. S. T. BURRELL (London) directed attention at the outset to two factors—the nature of fluid and the cause of its effusion. Fluid due to heart failure should be removed at once. Of the clear fluids he recognised only tubercle as a cause; the reported rheumatic and other effusions were probably at origin also tuberculous. For treatment the primary question was always whether to aspirate or leave alone. He thought that in all cases the first thing to do was to remove 5 c.cm. for examination. Clear fluid was to be left severely alone, except (*a*) to relieve pressure by removal in part, (*b*) to convert effusion into pneumothorax, (*c*) to allow a lung to expand when its opposite fellow was extensively diseased, or (*d*) to treat a chronic or recurrent effusion. Removal of large volumes of fluid was not without danger; it might cause dyspnœa, or more commonly it might start an acute flare-up of a tuberculous process. Dr. Burrell stated the rule that fluid volumes over 50 ounces should be replaced by gas, selecting air for prolonged action, and oxygen for temporary effect. Fever, he said, was responsible for the degree of illness and the effusion of the fluid, and both would settle down if left alone. Early intervention caused exacerbation in most cases.

In the very chronic cases, among which neoplasm was so common, the treatment he recommended was removal of the fluid, lavage with Carrel-Dakin solution, and filling of the cavity with oxygen to a pressure of minus 6.

After-treatment was of the greatest importance, for over 45 per cent. of cases ultimately developed active

pulmonary involvement, and prolonged sanatorium treatment, with its graduated exercises and education in personal hygiene, was essential.

In purulent exudates a clear difference between pyothorax and no pleural adhesion on the one hand, and empyema with its localisation by adhesions, was the key to treatment. In pneumococcal empyema the lesion appeared when the primary illness was over, and the pus was localised as an empyema. Operation was then successful and no pneumothorax was created. In acute influenzal pneumonia a pyothorax arose in the course of the illness; the fluid was thin and milky. Operation then caused complete pneumothorax, the flexible mediastinum allowing the pressure in the opposite lung to fall also, and death resulted. The presence or absence of pleural adhesion was the key to the treatment; the healing of cavities closed by adhesions could be hastened by Dakin irrigation, which promoted both sterilisation and healing. Thoracoplasty was still sometimes necessary, but should be regarded by the physician as a sign of the failure of his treatment; much might often be done by pleural lavage to avoid it.

Prof. A. RAMSBOTTOM (Manchester) referred to the frequency with which pyrexia in these cases lasted for three weeks, during which time of active disease the fluid could best be left, no damage to the lung resulting. Its removal during the pyrexial stage often led to its reaccumulation, and, provided it was not purulent nor the signs of positive pressure very marked, the fluid was best left alone. The problem of removal of small effusions during the active period of influenzal pneumonia was a difficult one. His practice was to wait until the end of the fourth week, for many effusions resolved within that time; but if the chest wall was tender to pressure over the fluid, then removal at once was indicated. The damage done by removal of pleural fluid was said to be exaggerated, and pleural shock was never seen if it was removed at the rate of ten minutes to the pint.

Discussion.

Dr. WILLARD STONE (California) recounted his experience of empyema in a base hospital, during an epidemic of hæmolytic streptococcal infection, in which 25 per cent. of the residents were found to be carriers. An outbreak of measles was followed by a large number of empyemas, most of them bilateral. Early diagnosis was followed by early operation, the formation of an open pneumothorax and a mortality of 64 per cent. Treatment by repeated aspiration with Potain's aspirator was started to replace operation until after the fourteenth day. This measure reduced the mortality to 8 per cent. Dr. Stone referred to the use of novocaine as a local anæsthetic, and to the use of Brewer's tube, when drainage was required, to form a closed thorax and permit irrigation with Dakin's fluid. The four complications found in the empyema cases were purulent pericarditis (25 per cent.), purulent peritonitis, septic nephritis, and meningitis. The best time to operate on these pyothorax cases seemed to be the 12th–14th day, and the use of antistreptococcal serum appeared to give no help.

The CHAIRMAN thought that when fluid exudates reached the level of the fourth rib, they should be removed at the rate of ten minutes to the pint. The operation should be rendered painless, and he suggested local freezing and the use of a trocar. The Potain aspirator should not be violently exhausted from time to time, but partly exhausted, the negative pressure being maintained by gentle strokes of the pump as required. Full pulmonary expansion after larger effusions was best obtained at high alpine altitudes.

Dr. RUSSELL objected strongly to the great interference with working life, and the mental agony inflicted by a tuberculous outlook in these cases. Treatment by ordinary means was quite satisfactory. A large proportion of autopsies showed tuberculous lesions; therefore prolonged and expensive arrangements, as required by the sanatorium, were unnecessary.—Dr. ASTON KEY spoke of the frequency with which empyema was overlooked in small children, and Dr. ASTLEY CLARKE referred to the use of the boracic immersion bath, and the frequency of sudden death in babies suffering from empyema.—Dr. J. SPEARES mentioned the difficulty of treating chronic sinuses after empyema operation. Breathing exercises as practised in Vienna were valuable.

SECTION OF PATHOLOGY AND BACTERIOLOGY.

BACTERIAL FOOD POISONING.

Prof. J. SHAW (Manchester) DUNN presided over this Section.

Prof. J. CRUICKSHANK (Aberdeen) opened a discussion on the Distribution and Characteristics of Bacterial Food Poisoning. The sporadic nature of outbreaks, the dramatic onset of symptoms and frequent difficulty in tracing the cause, he said, excite interest in all the medical men, but the unexpectedness of the outbreaks both in time and locality hinder systematic investigation. The characteristic symptoms are sudden onset of nausea vomiting, severe diarrhœa, abdominal pain, and pyrexia. The interval between the taking of infected food and the onset of symptoms is short, varying from 2–36 hours. In the majority of cases severe symptoms persist only for a short time, and within 24 hours the patient suffers only from exhaustion. Pyrexia is of short duration, and may be absent. Blood and mucus are rarely found in the stools—a distinguishing feature from dysentery. The extremely short incubation period in some cases has suggested that symptoms result from preformed toxins, and in certain outbreaks there is clear evidence that the suspected food has been subjected to such exposure of heat as would ensure death of all vegetative forms of bacteria.

Since the discovery of Gaertner's bacillus in 1888 a large number of organisms closely allied in morphological and biochemical reactions have been described as the cause of food poisoning in man, or severe enteritis in animals. These organisms are closely allied to *B. paratyphoid* B. The organism most frequently found is *B. aertrycke*. This and closely allied organisms have been demonstrated in the intestines of animals. With extension of bacteriological methods the list of food poisoning organisms is constantly being lengthened, and in many ways has made the problem more difficult, especially for the routine bacteriologist.

An important feature in most outbreaks is that the food is not obviously unsound; this affects investigation, since if all the food has been eaten the cause may remain obscure, unless an organism of the salmonella group can be isolated from the patient's vomit or stools. However, there may be indirect evidence, such as blood agglutination. A puzzling feature in some outbreaks is the small number of individuals affected, although the infected material has been widely distributed. Individual susceptibility, or partial infection of the material, may be the explanation. According to W. G. Savage, human carriers are not to be regarded as playing an important part in infection, but the possibility cannot be excluded.

Among the foodstuffs which have been found to be associated with food poisoning tinned meats are especially important. The possibility of infection from eggs has been raised in a recent case, and it has been shown that severe diarrhœa in chickens and ducks may result from infection with *B. aertrycke*. Milk offers suitable conditions for growth of the organisms, and where this food is the vehicle outbreaks are widespread and severe. When fresh meat is incriminated, the animal from which the joint is cut may have been the subject of salmonella infection. The way in which tinned foods become infected is not clear. It is necessary to suppose that individual tins are infected from an unknown source, and that considerable growth of the organism has occurred with the development of "toxins" which are heat resisting. Prof. Cruickshank observed that he had great difficulty in

accepting the explanation attributing outbreaks to toxins. It would be necessary to postulate a time interval for the development of toxins, and in many outbreaks there is no evidence that these conditions were present. It was inconceivable to him that a few dead organisms could be held responsible for the pronounced symptoms of food poisoning.

With regard to infection from meat of animals, he continued, it is believed that the source of infection arises from the soiling of meat with intestinal contents. If the view of Savage be accepted, that heat stable poisons are the cause of these outbreaks, we must suppose that the organisms have developed in large numbers between the death of the animal and cooking. The infrequency of *B. Gärtner* and *B. suipestifer* in these outbreaks is important, since these types appear to be the most frequent exciting agents of disease in cows and pigs. The occurence of *B. aertrycke* in the diseases of food animals is extremely uncommon, yet *B. aertrycke* is the most common finding in human outbreaks. The view strongly advocated by Savage that salmonella infections account for all food poisonings except those definitely chemical has led to the concentration of investigation upon the discovery of this group of organism with the result that other possible bacterial causes may be missed. A great extension of the bacteriological methods used in attempts to solve the problem of food poisoning is desirable. Evidence of invasion of the blood stream by organisms is rarely obtained, but the development of agglutinins to salmonella organisms occurs frequently. The difficulty of producing agglutinins in experimental animals by administration of the organisms through the alimentary tract makes their occurrence in food poisoning cases all the more remarkable, since their production in the blood is a common phenomenon after parenteral injection of living or dead bacteria. The presence of antibodies in the blood suggest that a living organism is responsible rather than preformed toxins. Savage and Bruce White record the development of agglutinins in rabbits as a result of feeding boiled cultures of *B. aertrycke*, and Geiger and Meyer after feeding to mice and a monkey. The development of agglutinins in rabbits after repeated injections of extracts of suspected meats shown by Savage and White is of little value since the titres obtained are very low.

Much interest lies in the question of the production of heat resistant poisons by salmonella organisms. Savage and White have supported the view that such toxins give rise to food poisoning, but the enormous number of organisms used by them produced only slight lesions; it is impossible to believe that any portion of meat producing poisoning in man could contain such numbers. Unless man is extremely susceptible, these experiments fail to convince. Several workers have obtained negative results by administration of toxin and killed organisms by mouth. On the other hand, Geiger and Meyer claim to have produced definite lesions with a heat resistant toxin derived from *B. aertrycke*. The animals used were mice. Rabbits, guinea-pigs, and cats usually presented very transitory symptoms, and it is remarkable that such difficulty should be encountered in producing toxic manifestations in animals which are frequently the subjects of natural infection. Further experiments on monkeys may prove of value. As a result of a survey of epidemics of paratyphoid fever, Savage and White have come to the conclusion that symptoms of food poisoning are absent in these outbreaks. In some cases, however, the symptoms of food poisoning definitely occur; it is doubtful whether a rigid separation of food poisoning from paratyphoid fever is justifiable on clinical grounds. On the other hand, organisms of the *B. suipestifer* group may produce symptoms resembling typhoid fever. The outbreak of food poisoning due to *B. aertrycke* in our troops in France, recorded by Perry and Tidy, suggests that a chronic carrier was the cause of initiation of the outbreak. In civil life the outbreaks are rarely examined so minutely. The work of Bruce White on the salmonella group is of great importance, especially in showing that the organism isolated in the majority of cases of food poisoning is *B. aertrycke*. The problem of the source of infection still remains obscure.

Discussion.

Dr. W. G. SAVAGE (Weston-super-Mare) said that he did not consider that all cases of food poisoning were due to salmonella organisms, nor that human carriers could be completely excluded as possible source of infection. Dr. Savage dealt at some length with the possibilities of the occurrence of preformed toxins. He considered that the evidence justified the claim that such toxins can be formed by salmonella organisms; from his investigation of the canning process in America, he found that a time interval was often present between obtaining the meat and canning it. The food was undoubtedly sterile when eaten, and the time incidence of occurrence of symptoms greatly supported his view. The apparent lack of support obtained in animal experiments he considered to be due to the comparative greater susceptibility of man to these toxins.

Mr. P. BRUCE WHITE (London) dealt with the classification of organisms of the food poisoning group. Several genera were believed to be implicated, and dysentery and salmonella groups were definitely associated with the disease. A very large number of species had been described; many of which were not separate types, but the introduction of agglutination tests had led to systematic classification. The speaker described the specific and non-specific antigen character of members of the group.

Dr. W. SCOTT (London) described interesting and important evidence to show that eggs may be responsible for certain cases of food poisoning. He described several outbreaks of food poisoning in which all possible infection, other than eggs, had been excluded, and although there was no absolute proof, circumstantial evidence tended to show that eggs were responsible. Duck's eggs appeared to be far more dangerous in this respect than hen's eggs. An epizoötic among ducklings was described, in which *B. aertrycke* had been isolated. There was some doubt as to the way that eggs become infected. It had been suggested that introduction of foreign material into the oviducts during copulation might infect the white of the egg. Eggs placed in a fluid culture of *B. aertrycke* might become infected, but negative results had been obtained with dry cultures. Ducks fed with *B. aertrycke* passed large numbers of these organisms in their excreta. The dry surroundings that hens chose for egg-laying might account for the smaller liability to infection of their eggs. The great importance of recognising that eggs might be a source of infection lay in the fact that many of the single sporadic cases of food poisoning which occurred might be explained in this way, since eggs were probably the most common unshared dish consumed in this country.

Dr. D. NABARRO (London) discussed the relation of food poisoning to dysentery. He pointed out that dysentery is not uncommon in children in this country, and that the possibility of this infection should be always kept in mind in suspected cases of food poisoning.

Bacillus Abortus Infection in Man.

Dr. W. D. CHAMPNEYS (London) read a paper on *Bacillus abortus* Infection in Man. He showed that the number of cases of this disease recorded in European countries was steadily increasing now that it is recognised that an undulant fever can be produced by an organism which belongs to the same (brucella) group as *Micrococcus melitensis* and occurs in cow's milk. In addition to those who might acquire infection from drinking milk, persons handling living and dead cattle might be subjects of infection. The organism responsible, *B. abortus*, was killed by pasteurisation. This organism had been injected into human beings by some workers without the production of harmful effects. The symptoms of the infection were almost identical with those of Mediterranean fever, and accurate diagnosis could only be made by hæmoculture and agglutinin tests. Injection of suspected blood in guinea-pigs was an excellent method of

investigation. The speaker believed that if systematic examination for brucella infection was made in cases of pyrexia of obscure origin, the number of cases of this infection would probably be found to be much greater than was suggested by the present statistics.

Prof. MEYER (California) communicated a paper which was read in his absence. He had investigated various strains of the brucella group, and described variation in virulence of various strains in monkeys. He pointed out that many individual animals possess a natural immunity for such infections. Cultures kept for long periods tended to lose their virulence.

Dr. G. ROSS (Rhodesia) described the occurrence in Africa of cases of undulant fever due to *B. abortus*. He had made systematic examination of cases of pyrexia, which had been diagnosed as such conditions as phthisis and influenza, and found them to be brucella infections. If attempt at hæmoculture was made, patience was necessary, since the organism rarely appeared in the first six days, and might require 10–14 days. The treatment he considered very unsatisfactory; vaccines were not recommended in the pyrexial stage.

Dr. W. PARRY MORGAN (Cardiff) described four cases of brucella infection which he had investigated, the first occurring in 1912, and two within the last year. He had examined 40 samples of blood submitted for Widal reaction, and found that two of them gave positive agglutination with *B. abortus*. A number of samples of milk had also been examined by injection into guinea-pigs, and 25 per cent. of these developed agglutinins. The *B. abortus* was isolated from some of these cases, but only when it was cultivated in an atmosphere of CO_2. He emphasised the importance of recognising the marked inhibition zone in the serum agglutination.

SECTION OF OBSTETRICS AND GYNÆCOLOGY.

CHRONIC CERVICITIS (LEUKORRHŒA).

Prof. FLETCHER SHAW (Manchester), the President, was in the chair when

Mr. J. BARRIS (London) read a paper on the Ætiology and Symptoms of Chronic Cervicitis. He defined this as an inflammatory affection, involving the mucous membrane of the cervical canal and os uteri externum, characterised by leukorrhœa, erosion, and microscopic signs of inflammation. After describing the anatomy and development of the generative tract with especial reference to the changes in the epithelial lining, the speaker said that bacteria were not normally found above the external os. In chronic cervicitis, however, bacteriological investigation revealed the presence of pathogenic organisms. The invasion might be the result of direct infection, or of indirect infection following injuries to the cervix. Mr. Barris showed figures to illustrate that the condition was most common in the child-bearing period. A consideration of the complications of chronic cervicitis made evident its importance. Mr. Barris described the cervix as the tonsil of the pelvis, and stressed the fact that it may act as a focus of infection. In conclusion, he referred to K.V. Bailey's work on the basic cause of cervical cancer and its relationship to chronic cervicitis.

Mr. G. I. STRACHAN (Cardiff) spoke on the pathology of chronic cervicitis, explaining that the anatomical relations of the cervix were important in this connexion. The essential lesion in cervicitis, he said, is irritation produced by pyogenic infection, most usually brought about by the lacerations consequent on childbirth. There is œdema of the sub-epithelial stroma with outpouring of lymphocytes and plasma cells, especially round the blood-vessels and glands, and under the surface epithelium. The blood-vessels dilate, the surface columnar and glandular epithelium become irritated, so that glandular hypertrophy with distension occurs, and the cervical secretion becomes increased in amount and of a muco-purulent appearance. Some of the squamous epithelium surrounding the external os becomes separated and cast off in the discharge, and the columnar epithelium is stimulated and grows down to cover the raw area, carrying with it in its outgrowth cervical racemose glands giving rise to the appearance described by Eden and Lockyer as pseudoadenoma. In discussing the late results of cervicitis, Mr. Strachan said that the parametrium was frequently affected by lymphatic extension from the cervix, so that in the early stages infiltration and later fibrosis was produced. The parametrial extensions were the most common causes of backache or chronic pelvic pain in women. Absorption of toxins from the chronically inflamed cervical surface led, in some cases, to general ill-health, shown clinically by muscular rheumatism and osteoarthritis. Mr. Strachan pointed out that while severe puerperal sepsis accompanied by pyrexia occurred in about four cases per 1000, puerperal sepsis in a minor degree occurred in a large proportion of all parturient women. Often no symptoms were manifest at the time, but the results of the infection lasted for many years, and carried with them a risk of carcinoma formation.

Dr. R. S. STATHAM (Bristol) spoke on treatment, expressing his personal views. He thought that chronic endocervicitis was one of the commonest causes of sterility and perhaps even more often of the one-child marriage. Mild thickening and inflammation of the pelvic cellular tissues gave rise to pressure on the ureter, with chronic backache and renal pain. This process had been described by Guy Hunner, and had stimulated Dr. Statham to pass ureteric bougies in certain cases of backache associated with cervical erosion, much benefit having ensued. There were two factors to be treated: (1) the leukorrhœa, and (2) the deep infection. Cervical lacerations should be repaired at the time of confinement. In venereal clinics Dr. Statham had observed typical erosions developing in cases of gonorrhœa, as well as in patients complaining of leukorrhœa and cervicitis in whom gonococci were found on further investigation. When gonococci were found Dr. Statham thought that the best treatment was daily douching with boric acid lotion, and when the discharge had been wiped away, thorough swabing of the cervix and vagina with 1 per cent. mercurochrome. In the cases where there was laceration of the cervix with thickening and tenderness of the bases of the broad ligaments—a mild grade cellulitis—the best results were obtained by prolonged hot douching by a skilled person; in private practice treatment could be carried out while the patient lay in a hot bath. Excellent results were obtained with the diathermy current in certain cases. When no response to treatment was observed, either repair operations or amputations or panhysterectomy should be undertaken according to the indications for the particular case. The speaker did not advise amputation of the cervix in young patients since it predisposed to abortion, and in one of his cases had led to cicatrisation, causing much trouble in labour. In elderly patients, especially in the presence of the so-called "fibrosis uteri," the operation of election was panhysterectomy combined with perineal repair when necessary. If true ulceration was found upon the cervix it was essential to remove a portion for histological examination. Finally, Dr. Statham advocated inspecting the cervix after delivery, and suturing any lacerations immediately.

General Discussion.

Dr. J. YOUNG (Edinburgh) emphasised the importance of erosion as a cause of chronic ill-health such as arthritis, rheumatism, and chronic heart disease. He thought that a good deal of abdominal pain could follow cervicitis. Dr. Young considered the best treatment to be a free opening up of the cervix by means of the surgical cautery. He had not encountered ureteral stricture in cases of cervicitis.

Prof. T. CULLEN (Baltimore) said that the cylindrical epithelium of the cervical canal sometimes extended over the vaginal portion of the cervix, whilst he had seen the squamous epithelium reaching almost up to the internal os. He thought that irrigation was going to prove the most efficacious treatment. Referring to operative treatment, he thought that it was sufficient to repair one side only. Prof. Cullen

never removed the uterus for prolapse in old women, since it was the keystone of the pelvis. He praised Hunner's work on ureteral stricture.

Mr. L. C. RIVETT (London) said that he had closely questioned many patients suffering from cervical cancer, and could not illicit any history of leukorrhœa to suggest preceding erosion; he had not encountered any patients with leukorrhœa who had developed carcinoma.

Dr. B. SOLOMONS (Dublin) advised a modified Schröder operation under general or local anæsthesia for erosion, and did not think that either mercurochrome or any of the other local applications produced permanent benefit. Many women could be cured by means of constitutional treatment. Hysterectomy should be left to the very last, and only be undertaken after very careful consideration. Dr. Solomons considered it very dangerous to teach students to examine and repair all cervices immediately after labour; in his view the right procedure was to examine the patients six weeks after the birth of the child, and then carry out any plastic operation necessary.

Dr. C. FORBES (Aberdeen) thought that the products of split protein might be the cause of erosion and leukorrhœa.

Prof. C. G. LOWRY (Belfast) referred to the importance of the cervix as a focus of infection, and mentioned an investigation which they had been carrying out on cases of rheumatism, with a view to finding out whether the cervix was the source of infection. He pointed out the difficulty of finding gonococci and in deciding how many cases were attributable to this organism. He did not agree with those who said leukorrhœa caused sterility in all cases.

Dr. K. V. BAILEY (Manchester) was chiefly interested in the pathology, and pointed out that the connexion of chronic cervicitis and cancer can be traced histologically. Cancer was the result of a constant contact with chronic irritative exudates of specific types.

Dr. J. RIDDELL (Plymouth) thought that the term erosion should be dropped entirely for cervicitis. He considered that there ought to be a time-limit for medicinal treatment, and suggested that surgical procedures should be resorted to at the end of six months. He deprecated the adoption of vaginal hysterectomy, and said that the abdominal operation should be chosen in order that a more adequate investigation might be made.

Dr. F. MURRAY (Newcastle) said that a thorough investigation should be carried out before any treatment was undertaken. He had found that there was often an infected urine which should be treated at the same time. In cases where there had been extensive lacerations of the cervix, reparative operations might be dangerous owing to the close proximity of the large venous plexus and the ureters. He had had excellent results from instilling into the vagina, whilst the patient lay on her back, about two ounces of a mixture of one part of tincture of iodine and two parts of glycerine.

Dr. K. FOSTER (Worcester) held that the cause of erosion was injury at birth; proper antenatal care would prevent the need for deliveries by forceps, and would therefore diminish the incidence of erosions.

Prof. I. P. MAXWELL (Pekin) said that he had been n the habit of taking a section for microscopical examination from the cervix of every patient whose symptoms did not clear up rapidly under skilled douching (which he had been employing for some considerable time), with the result that he had succeeded in discovering a number of early carcinomata.

Prof. D. DOUGAL (Manchester) thought that curettage and amputation of the cervix would cure a certain number of cases.—The PRESIDENT did not think enough had been said about cauterisation as a method of treatment. He considered that douching tended to keep up a chronic discharge. Leukorrhœa began to worry the patient as her general health deteriorated, and with improvement of the constitutional condition the discharge produced no discomfort.

Dr. STATHAM, Mr. STRACHAN, and Mr. BARRIS replied.

SECTION OF OCCUPATIONAL DISEASES.

THE PRESENT POSITION OF SILICOSIS IN BRITAIN.

The discussion was opened by Dr. E. L. MIDDLETON, H.M. Medical Inspector of Factories, who dealt with (1) the occurrence of the disease in the various industries throughout this country; (2) the manifestations of the disease as it presented itself to medical practitioners; and (3) the legislation which had been brought into being within recent years. In a brief review of the ætiology, symptomatology, and pathology of the disease Dr. Middleton remarked that silicosis was produced by the inhalation of particles of silica, and in silicosis, properly so-called, the silica was in the form of free dioxide of silicon (SiO_2)—e.g., quartz or flint. The particles, to produce the disease, must be inhaled into the ultimate pulmonary tissue, and must therefore be of a degree of minuteness which would permit of their free passage in the mid-current of the air through the upper respiratory passages and the finest bronchial tubes. The particles were phagocyted and the lymphatic channels, perivascular and peribronchial, contained deposits of these cells which produced a reaction in the surrounding tissue. Fibroblasts were produced, changing ultimately into fibrous tissue which underwent condensation and contraction resulting in distortion with loss of function of the remaining lung tissue. Foci of tuberculosis were commonly found embedded in the dense fibrous tissue. In some cases no massive fibrotic areas were found, but in both lungs nodules varying in size from 0·1 to 1·0 cm. in diameter were present in large numbers. Sections of the lung showed the nodules to be formed in a characteristically whorled arrangement of fibrous tissue, and often particles which (if 5 μ in diameter) could be demonstrated by polarised light.

The inhalation of silica dust was not usually accompanied by evidences of irritation. When free from other dusts of an irritating kind silica might be inhaled by workers without any suspicion that they were exposed to dangerous dust. Herein lay the perils of indifference on the part of the worker and absence of suspicion on the part of the employer. Dyspnœa was usually the first symptom, and in its production two characters of silicosis were important. The first was the cumulative action of silica and the second the latent period for anatomical changes to take place in the lung. Symptoms might follow exposure to silica dust at any time from 2 to 40 years. One of the problems to be solved was: Is the disease recognisable at a stage when removal from exposure to silica dust will not be followed by disablement? In diagnosis, said Dr. Middleton, the employment history should be exhaustively studied, while a careful clinical examination, and a radiological examination by an expert were essential. Prognosis depended on (1) the amount of dust inhaled; (2) the period of time over which this acted; (3) the occurrence of infective processes, tuberculous or non-tuberculous. If the diagnosis could be made at such an early stage in the disease that sufficient silica had not been inhaled to produce irreparable damage, and so much damage has not been done as to produce disability, then it seemed that the disease could be arrested.

Dr. Middleton went on to discuss the industries in which silicosis occurred. The *Refractories Industry* employed 2000 to 3000 persons and was concerned with the manufacture of ganister and silica bricks. These bricks contained considerably over 90 per cent. of silica. A specialist medical board carried out periodical medical examination of all the persons employed. The *Sandstone Industry* represented the most widespread of all silicosis-producing industries, but the incidence of the disease was diminishing owing to the application of water and mechanical methods of dust suppression. The granite industry was allied to sandstone quarrying and dressing, but the subject was complicated because of the varying proportions of quartz, felspar, and mica present in the rock. As the result of an inquiry into the *Slate Industry* there appeared to be some evidence of the

production of fibrosis of the lungs, but the occurrence of actual disability within the ordinary working lifetime of workers was not clearly shown. In the *Grinding of Metals* silicosis, and especially the combined disease of silicosis with tuberculosis, were at one time extremely prevalent. The sandstone wheel was being largely replaced by wheels of abrasives such as carborundum. Allied to the grinding of metals was the process of *Sand-blasting* of metals and the etching of glass. This consisted in playing a jet of sand under high pressure against a metal or glass surface to produce certain effects. The process was becoming more extensively used, and it was a matter for serious consideration whether a substitute such as iron or steel grit could not be used to replace the siliceous grit as the abrading material. In *Pottery Manufacture*, both in the manufacture of earthenware and of china, Dr. Middleton suggested that "potter's asthma" was due to dust containing ground flint. Ground silica was used in many industries; in the crushing and grinding of silica and in the industries in which ground silica was used silicosis sometimes of an acute type occurred. The evolution of dust in these industries was controlled by the use of mechanical methods of handling, enclosure of machinery, and the use of localised exhaust draught. *Tin Mining* in Cornwall had a high mortality-rate from tuberculosis, and it was shown that this was associated with silicosis. Drilling of the highly siliceous rock in which the tin ore occurred was now done through hollow steel with a water feed. Silicosis also occurred in *Coal-miners* employed on hard headings. It would appear that once enough silica had been inhaled to produce the nucleus of fibrosis, the resulting inhalation of coal dust into a lung in which the lymphatic drainage had been disorganised increased the fibrosis and produced disability.

Dr. Middleton concluded by describing the methods for determining the concentration of dust in the atmosphere by the gravimetric method and the numerical or counting method, but pointed out that there was no criterion of air dustiness which could safely be regarded as indicating freedom from risk of producing the disease.

Dr. P. HEFFERNAN (Tuberculosis Officer, Derbyshire) read a paper on the biophysics of silica and the æetiology of silicosis. Silicosis, he concluded, was the result of the local action of hydrated silica upon the pulmonary tissue. This action was of a physico-chemical nature, and the speed of its development depended upon the rapidity with which fresh silica hydrosol was brought into contact with pulmonary tissues. Substances such as alkalis which favoured the formation of silica hydrosol from silica when added to silica dust accelerated the development of silicosis. Substances such as carbon, coal dust, or clays which retarded or prevented the formation of hydrosol from silica, or which coagulated the hydrosol when formed, retarded or prevented silicosis. Silica was a normal constituent of plant and animal cells and had a place in therapeutics comparable to that of lime.

Dr. WATKINS PITCHFORD (South Africa) spoke on siliceous dust in gold mining and uttered a warning about wet operations; siliceous mud, he said, was potentially siliceous dust. The noxiousness of siliceous dust was due to blocking of the lymph channels of the lung which allowed tuberculosis to develop.

Dr. R. E. LANE (Manchester) read a paper on the lead dust hazard. He showed that in industrial practice by far the most important portal of entry for lead was the respiratory tract. He spoke of the storage battery industry and of the types of lead dust met with in that industry. He emphasised the fact that normal healthy people both excreted lead in the urine in measurable quantities and showed minor degrees of punctate basophilia. In a research carried out on groups of lead workers in various departments he had found a definite relationship between the Pb. in the atmosphere, the Pb. excreted in the urine, and the punctate basophilia count; the basophilia could be used in estimating the danger arising from a lead process. He supported the findings of Sellars that all lead workers have a normal punctate basophilia, and that its mere presence cannot be taken as a proof of lead poisoning. It was, however, a delicate index of the degree of absorption, and as such of great value in anticipating trouble.

INDUSTRIAL TUMOURS OF THE BLADDER.

Dr. T. H. WIGNALL (Manchester) opened a discussion on the incidence of disease of the bladder in workers in certain chemicals. Certain chemical agents, he said, were known to cause forms of acute dermatitis and conjunctivitis, or bronchial and nasal troubles; others (for example, aniline) by absorption, ingestion, or inhalation, produced pigmentation, visible on face, hands, and ears, as well as general bodily weakness, dyspnœa, and possibly blood in the urine, owing to the production of methæmoglobin in the blood. Such cases, seen early and treated, recovered health, and he had not heard of any subsequent growths from acute illnesses of this type. Men working on *a*-naphthylamine for some years reported a frequent desire to micturate with strangury and blood in the urine. Cystoscopic examination revealed a neoplasm at the ureteric orifice in the bladder.

Mr. J. B. MACALPINE (Manchester) showed lantern slides and pathological specimens of carcinoma and papilloma of the bladder in aniline workers, many of whom were sent to him by Dr. Wignall. The growth in these workers would appear to be more malignant than similar growth in the general population.

Dr. ARCHIBALD LEITCH (London) spoke on experimental work with aniline dye-products. He had had no neoplastic response to any particular substance in mice, and suggested that the final carcinogenic agent was an end-product actually produced in the bladder itself.

Prof. J. M. STEWART (Leeds) suggested that inhalation of aniline dust rather than ingestion was the cause of the urinary troubles.

Dr. VERNON DAVIES, M.P., asked if anyone could give a definite opinion as to whether synthetic dyes did cause carcinoma of the urinary tract.

The PRESIDENT said that without doubt these tumours were far more prevalent among synthetic dye workers than in the general population, but no particular substance at the present moment could be blamed.

Dr. DONALD CAMPBELL (St. Helens) read a paper on the silicotic lung, in which he discussed the early diagnosis and differential diagnosis of the various fibroses of the lung, the importance of finding silica in the sputum, and of radiograms taken by an expert.

Dr. L. CAROZZI (Geneva) spoke on the human aspect of industrial diseases and accidents, and the need of utilising to the full the result of scientific investigation in other fields: physiology, pathology, and biochemistry. He dealt with idiosyncrasies in absorption and elimination in certain industrial skin diseases and industrial cancer, and stressed the necessity of constant medical examination of all workers, not only the sick but those in good health.

Mr. L. WARD (Engineering Inspector of Factories) gave a lantern demonstration of methods of prevention of industrial dusts.

The PRESIDENT illustrated the various processes of the cotton industry by lantern slides, and pointed out the dangers to health during each process.

Dr. E. S. BURT HAMILTON (Manchester) read a paper dealing with skin and mucous membrane lesions in chrome and arsenic workers.

In the pathological museum there was a large display of specimens, photographs, and charts contributed by Sir Thomas Legge, Prof. Stewart, Dr. Heffernan, Dr. Lane, Dr. S. A. Henry, Dr. C. C. Twort, Dr. Middleton, Dr. Cooke, and Dr. R. Prosser White.

SECTION OF ORTHOPÆDICS.

Scoliosis.

Opening Address.

Sir ROBERT JONES presiding, a discussion on scoliosis was opened by Mr. D. MCCRAE AITKEN (London), who introduced a cinematograph film illustrating his methods and results. He pointed out that scoliosis was one of the earliest, as it was still one of the most difficult, problems of orthopædic surgery, and said that the observations of the early writers were as accurate and practically as valuable as those of to-day. It was the principles, not the details of treatment that mattered. He traced briefly the evolution of his own methods of treatment, wherein he had tried to apply to the spinal joints the principles laid down by Sir Robert Jones for other joints—i.e., continuous retention of the correct position while recovery of muscular function was taking place. His conception of these principles had been somewhat modified by the experiments of Sherrington and Magnus, which showed the importance of the inhibitory reflex, and that contractures, such as those of scoliosis, were often due as much to active shortening of muscle as to fibrosis. The postural reflex was largely a new name for the phenomenon long known to psychologists as the "automatic reflex," which played a large part in the training of athletes. Haglund, in using his short plaster jacket to tilt the lumbar region, had been one of the first to harness the postural reflexes to correction of the deformity. Mr. Aitken had found a modification of the Abbott type of jacket the most effective, because of its flexion of the spine to correct what he called the "squint lordosis," its pressure on the prominent ribs altering their habitual excursion into a more favourable one, and its power to deviate the patient's weight on to the leg opposite to the one he habitually used. This last point was important, and the speaker demonstrated that the side of the chest on the same side as the leg taking most weight was the one which expanded most, both with quiet and forced respiration—a phenomenon used by rowers for turning a boat, to do which they merely pressed harder on one foot.

An admirable film, produced by the Stoll Co., illustrated the points referred to by Mr. Aitken, especially the unequal breathing on the two sides of the chest. It also demonstrated each stage in his application of the modified Abbott jacket, and showed the patients standing and walking after the treatment. Without the previous photographs it would have been hard to believe how severe the initial deformity had been. With good team work, Mr. Aitken stated he could apply one of these jackets in half an hour. Correction was best maintained, he said, if the patients were taught only simple exercises for use in their own homes, not being allowed to depend on the atmosphere of the gymnasium. Besides the important exercise of sitting with pressure on the foot of the suitable side and standing on that leg, he strongly recommended the recumbent breathing and posture exercises of Goldthwait, of Boston, of which Miss Forrester-Brown had been the chief exponent in this country.

Discussion.

Mr. A. BLUNDELL BANKART (London), while congratulating Mr. Aitken on his results, expressed the conviction that even better ones would ultimately be attained if research continued. He thought scoliosis was essentially a contracture of a compound joint and that correction of the mechanical defect should precede education of the muscles. For this purpose he still advocated traction, for he did not believe effective pressure could be brought to bear on the spine through the ribs. Abbott's method only achieved a high degree of compensation, not actual correction of the defect, and this was disappointing. Scoliosis was a growth defect, comparable to club-foot and equally difficult to correct permanently. He suggested that there might be possibilities in skeletal traction.

Miss M. FORRESTER-BROWN (Bath) analysed the treatment of 65 cases, most of which were old neglected ones coming too late for correction but still amenable to great improvement in the general body balance and health. Only five had had correction in plaster jackets, and this had been applied by a modification of Galeazzi's method with the patient standing with the spine flexed. The shoulders and pelvis were included in independent parts and then joined together, while an attempt was made to correct the rotation deformity. A number of cases had got considerable gradual correction by sleeping for years on a plaster bed of Jansen's type. More than half the cases had required braces to support the spine and in the manufacture of these the speaker emphasised the necessity of having the plaster mould made by an expert, while the positive model on which the jacket was to be built must be modified by, or under the eyes of, the surgeon. To hand the patient over to an instrument-maker without further surgical guidance was very unsatisfactory. In regard to the upper thoracic and cervical curves, which Mr. Aitken regarded as desperate, Miss Forrester-Brown had found that improvement of balance resulted from Elmslie's method of keeping the head a little suspended when the patient was seated during lessons. This helped the postural re-education. Although one might hope to prevent the majority of these severe cases by early diagnosis and treatment, some of the rickety and paralytic ones developed very insidiously, and parents were extraordinarily unobservant. Congenital cases were tedious to treat and the condition was apt to occur in poor homes, where they would be neglected.

Mr. P. B. ROTH (London) disagreed with Mr. Aitken's assumptions, saying that scoliosis was primarily a bone disease with no muscle defect and that wedge-shaped vertebræ could not be straightened again with intermittent pressure from bent ribs. He thought that the best results were got from muscle-training in a gymnasium.

Mr. AITKEN, in his reply, said that nobody claimed to undo the wedging of the vertebræ, but only to mask it by improved body balance. He added that his plaster jackets did not interfere with school life, and the children played hockey in them.

Torticollis.

Mr. WHITCHURCH HOWELL (London) then read a paper on the treatment of torticollis. He advised subcutaneous tenotomy, done with very special precautions and followed by immediate fixation in the over-corrected position in plaster-of-Paris, which must include the whole chest and bear well on the mastoids and lower jaw. He quoted 20 successful cases out of 21 and showed slides of two excellent results.

A discussion followed in which the speakers were: Mr. R. OLLERENSHAW (Manchester), Mr. ROTH, Dr. WHITE (Norwich), Mr. AITKEN, and Miss G. HERZFELD (Edinburgh). Most of these, except Mr. Roth, deprecated the subcutaneous method as dangerous, except in the hands of someone of special experience such as the reader of the paper. They also considered it likely to be ineffective, because the fibrosis was seldom restricted to the sterno-mastoid muscle, usually involving not only its sheath but all the layers of deep fascia, often the arterial sheath itself, so that radical cure demanded a wide and careful dissection. They did not regard plaster fixation as necessary after the thorough operation, nor did they find a carefully placed skin scar to be conspicuous or troublesome.

CHELTENHAM GENERAL HOSPITAL.—This institution has been enlarged by the addition of 23 beds, a new out-patients' department, and an extension of the nurses' home. The work has cost £32,000.

ENLARGEMENT OF WAKEFIELD CLAYTON HOSPITAL.—Mr. S. Canning Childs, of Camden, New Jersey, U.S.A., who last year gave a new out-patients' department to this hospital, is now presenting it with a new women's ward which will have 48 beds, and will cost £30,000.

Reviews and Notices of Books.

STONE AND CALCULOUS DISEASE OF THE URINARY ORGANS.

By T. SWIFT JOLY, F.R.C.S., Surgeon to St. Peter's Hospital. London: William Heinemann, Ltd. 1929. Pp. 568. 45*s*.

THE author has presented us with a work that will surely be found on bookshelves abroad as well as at home, for great changes have taken place in this special branch of surgery during 20 years. Genito-urinary surgery, and particularly that branch which concerns the treatment of stone, has been revolutionised by the introduction of radiography and cystoscopy. The era of the exploratory operation for calculus has passed, the surgeon of to-day possessing a fairly exact knowledge of what he will find before he makes his preliminary incision. But, as Mr. Swift Joly points out in his preface, there exists yet another reason for bringing our knowledge of lithiasis up to date. Methods of diagnosis and treatment have changed, but so also has the disease itself. In certain areas of Great Britain, such as Norfolk and the Fen district, vesical calculus was formerly common; now it is comparatively rare. This is true to a less degree of other localities, for throughout the country vesical calculi are becoming less common, whilst the frequency of renal lithiasis remains about the same. The age and class incidence of the disease have also altered, so that it is no longer a disease of childhood found amongst the poorer classes, but of middle and of old age, occurring without discrimination of class. The reasons for these changes are discussed by the author at length in his second chapter. Stone formation, he points out, is due to a failure of the urinary colloids to hold the more insoluble urinary salts in solution. The change in its incidence witnessed in the last 50 years may perhaps be correlated with a general improvement in our dietary. There are reasons for believing that the excretion of an excessive quantity of uric acid is part of a deficiency disease, whilst oxaluria is often associated with intestinal fermentation. The more rational and varied dietary of modern times has the effect of diminishing both of these predisposing causes of stone formation.

Chapter III. deals with the diagnosis and treatment of renal calculus. In discussing its surgery the author shows a marked preference for the L-shaped incision recommended by Mayo, which commences over the last rib at the outer border of the erector spinæ and then passes outwards parallel to and about 1 inch above the iliac crest. If additional room is required, he advocates dislocating the last rib upwards over the eleventh rather than excising it. Pyelotomy, in his opinion, should always be followed by suturing the pelvis. Leakage of urine favours infection of the kidney, and this in clean cases is a disastrous sequel. When subcapsular nephrectomy is undertaken, Mr. Joly urges that every effort should be made to remove the whole of the renal pelvis. This is best achieved by Albarran's method of exposing the renal pedicle through a vertical incision in the lower portion of the stripped back capsuli. If this is not done a very thick pedicle is tied off containing the whole of the renal pelvis. As these cases are invariably infected a persistent sinus almost inevitably follows.

Mr. Joly holds the view that, generally speaking, surgeons err on the side of being too conservative in their surgical attack on stone. In many cases in which a pyelotomy or nephrolithotomy has been performed much future trouble would have been avoided if nephrectomy had been substituted. The aim should be to deal in the most efficient way with sepsis, and a prompt nephrectomy or nephro-ureterectomy, by totally eradicating the diseased area, may save the opposite side from subsequent trouble. In dealing with impacted ureteric calculi non-operative measures should only be attempted when the stone is lodged in the lower portion of the ureter. Even then the surgeon should be prepared to do an open operation after one failure to obtain expulsion by other means. The work concludes with adequate chapters on calculous anuria, vesical, prostatic, and urethral calculi. At the end of each chapter a table of references gives an indication of the author's extensive acquaintance with the literature of calculus, and at the beginning of the book is an entertaining historical sketch which takes the reader from 7000 B.C. up to A.D. 1924. Although illustrated with less profusion than most of the works that come from the other side of the Atlantic, the plates and diagrams are adequate and of good quality. The text throughout is clear, and the treatment of the subject practicable. Mr. Joly may enjoy the satisfaction that comes from knowing that he has written a standard work on the subject he has made his own, and we predict that Joly on Stone will be as well known to urologists of the present generation as was Jacobson on Surgery to surgeons of the last.

PHARMACY.

Pharmaceutical Formulas. Vol. I. Tenth edition, entirely revised and rewritten by S. W. WOOLLEY and G. P. FORRESTER. London: The *Chemist and Druggist*. 1929. Pp. 1146. 15*s*.

THIS is the tenth edition of a valuable book of reference which has appeared at steady intervals for the last 30 years. The original design of the book remains—that is to say, that we have here a collection of formulas for old as well as new preparations, which not only pharmacists and others in the drug and allied trades require, but which a great many medical practitioners will find of practical value. The present edition has been entirely revised and rewritten by Mr. S. W. Woolley, a former editor of the *Chemist and Druggist*, and Mr. G. P. Forrester, who now occupies that post; and their emendations have been directed towards the satisfaction of fresh demands, and recording progress in the art of compounding. As the authors point out in their preface, great advances have been made throughout the domains of pharmacy within recent years, coincident in many directions with advances in medicine, consequently many therapeutic agents have been added to materia medica, and improvements as well as innovations introduced in the manufacture of pharmaceutical preparations.

The volume is made up of selected formulas from the British, United States, and other pharmacopœias, together with non-official formulas from various sources, including numerous descriptions of practical methods employed in the manufacture of pharmaceutical preparations and other information of use to pharmacists and drug-producing firms, and of increasing interest to doctors. The pages comprise also a selection of formulas for "known admitted and approved remedies" from former editions and from the *Chemist and Druggist* diaries. The practical nature of the book is reflected in the fact that its contents in many instances represent inquiries received by the editor of the *Chemist and Druggist* from chemists and manufacturers at home and abroad, and seeking particulars regarding recent medicaments, and preparations included in hospital or foreign pharmacopœias. Many of these questions have had reference to formulas designated by the name of their authors or originators, and, as we can quite understand, the editor of our contemporary has had great difficulty in some instances in rendering correct replies. The employment of such titles for a prescription as "Stokes' Expectorant," "Franklin's Formula," "Griffith's Green Mixture," "Heberden's Ink," and so forth, is of historic interest, but from a scientific point of view the sooner these nicknames disappear the better.

A second volume, now in course of preparation, will contain formulas which cannot properly be classed as pharmaceutical, such as recipes and processes for the preparation of a wide range of articles which contribute to the interests of modern life. This promises to be very interesting, and, judging from the analogy of

"Cooley," of high practical value. For it is a little astonishing to find how many articles of daily use are mysteries, as far as their composition is concerned, to those who are familiar with their frequent application.

Physics for Students of Pharmacy. By C. J. SMITH, Ph.D. London: Edward Arnold and Co. 1929. Pp. 287. 9*s*.

THERE are to-day so many books, small, middle-sized, and large, compiled to meet the needs of the commencing science student, that a first impression on seeing yet another elementary text-book of physics necessarily is that there can hardly be room for it. Dr. Smith, however, has arguments to the contrary. He has thought that the syllabus of the Pharmaceutical Society of Great Britain invited a manual to meet the needs of those who would comply with the professional tests, and he has accordingly furnished some excellently clear instruction, in which the brevity of the first sections is accounted for by the fact that he has expected his readers to have done a course of matriculation physics at some previous period. Epitomising has been the author's aim, but always with the endeavour to make definitions clear, and his objects are accomplished. The section on light is done in more detail than is usually the case in books of this range, and in the section on magnetism and electricity there are many paragraphs which clear up difficulties in a manner which should appeal to the often puzzled student. For example, the chapter on magnetic measurements and that on electrical resistance will be really useful to many reading physics with whatever aim, for undoubtedly the phenomena described are, even when laboratory work goes hand in hand with reading, obscure to the early worker. This is a good little text-book.

SPECIAL CYTOLOGY.

Edited by EDMUND V. COWDRY, Ph.D., the Rockefeller Institute for Medical Research. New York: Paul B. Hoeber; London: Humphrey Milford, Oxford University Press. 1928. 2 vols. Pp. 1348. 693 illustrations. 94*s*. 6*d*.

Handbook of Microscopical Technique. Edited by C. E. MCCLUNG, Ph.D., Professor of Zoology and Director of Zoological Laboratory, University of Pennsylvania. Same publishers. 1929. Pp. 495. 36*s*.

THE work on Special Cytology is supplementary to the earlier volume on General Cytology published under the same editorship by the University of Chicago Press in 1924, and the series is completed by the volume on technique under the general editorship of Prof. C. E. McClung. The custom of coöperative publications is more and more coming into fashion, and it is one for which we have nothing but praise. It is still possible for a single individual to write a biological or medical text book of a general or elementary nature, but a more ambitious work on any particular subject demands a breadth of knowledge and a grip of detail such as few men possess. A book written by many authors may lack cohesion and unity, and that imprint of personality which made many of the older text books really great. But it has the overwhelming advantage that each section is written by a specialist who has a first-hand knowledge of his subject, and is content to deal with that subject only.

No less than thirty-five authors contribute to the two volumes on Special Cytology, and differentiation is carried to such length that, for example, in the chapters dealing with the nervous system one contributor is responsible for the internal architecture of the nerve cell, another for the general relation of histological character to function in mammalian neurons, another for the sympathetic nerve cell, another for the neuroglia and microglia, and another for the cytology of the cerebro spinal pathway. Under these circumstances a single reviewer may be excused if he refrains from any attempt at detailed criticism and restricts himself to a general survey.

These volumes should be invaluable, not only to cytologists, but to workers on biology and medicine. It is all the more to be regretted, therefore, that it is necessary to publish them at a price which must be prohibitive to many laboratory workers. There are, it is true, a large number of illustrations, but many of them are copied from other works, and there are only two coloured plates. And while most of the illustrations are good, some are quite unworthy. For example, the 41 figures of the myeloblast, following p. 396, are of little or no value, though no doubt the authors' original coloured drawings, of which they are photographs, adequately fulfilled their purpose. Figs. 92 and 93 stand out as glaringly bad and old-fashioned, and some of the figures illustrating the chapter on the thyroid are unpardonable in a work of this class.

Perhaps the most striking impression the book makes is that cytology is a really vital and progressive science; it rests, of course, on an anatomical basis, but its trend is essentially physiological. Then, again, the breadth and ramifications of cytology are revealed in such a manner as to make it abundantly clear that it is very far from being, as many believe, a narrow and academic subject; and this, in spite of the restrictions which considerations of space made necessary. Attention is directed chiefly to those cells which make up the human body; animal forms below the mammalia are not specifically dealt with. Again, the work contains but little embryology, but on the other hand pathology is freely drawn upon when it throws light, as it so often does, on the normal. And each chapter contains an abundant bibliography, the better for being selected.

While not designed primarily for the medical worker, Prof. McClung's contribution to the series should prove valuable to those engaged in histological research. It differs from most handbooks of its kind in that attention is given to the principles underlying the making of microscopical preparations. The sections devoted to the examination of fresh material and to microdissection and injection are admirable, and the selection of typical staining methods judicious. Dr. Robert Chambers here deals with a subject which he has made peculiarly his own, and supplies excellent figures to illustrate the technique employed. In certain respects the work is not so profound and detailed as might have been expected. The section on fixation and fixatives is elementary and not particularly helpful; and in the troublesome subject of decalcification, the pathological histologist will find little assistance. A relatively large amount of space is devoted to the histological study of the blood, and in this section are included procedures, such as methods of determining hæmoglobin percentage, which scarcely come into the scope of a manual of microscopic technique. On the whole, however, this is one of the most valuable books of its kind to be published for many years; it should run into many editions. As a worker in histology grows more experienced, he will find that by following the principles set out in this handbook he will obtain such a grasp of microscopical technique that he can adapt it to his special needs, instead of planning his work on conventional lines.

NERVOUS AND MENTAL DISEASES FOR NURSES.

By IRVING J. SANDS, M.D., Associate in Neurology, Columbia University, New York. London and Philadelphia: W. B. Saunders Company, Ltd. Pp. 239. Illustrated. 8*s*.

THIS small book is well-planned and readable, and though intended for nurses will be found useful by students and those starting on mental hospital work as junior medical officers. The chapter on medical psychology is particularly good, though one may question whether manipulative and play instincts should be considered as instincts or more correctly as elaborations of instincts. The description of conditioned reflexes and conditioned emotional

reactions and their relative importance in training and in the prevention of illness is informative. The account of the neurotic personality is hardly adequate, the hysteric type alone being described. The description of encephalitis lethargica and its after-effect is good, but it is not made clear that the anti-social reactions occur most commonly when the acute disease attacks children and adolescents. The author is unduly optimistic as to the prevention of general paralysis of the insane by early treatment of syphilis.

Dementia præcox is here classed among psychogenic disorders, the alleged endocrine and neurological changes being ignored. Among the excellent suggestions for treatment is one of "beauty parlours" to train patients in care of their personal appearance, though we hardly expect to see these instituted in our own hospitals. More space might usefully be given to general paralysis, while the sections on other organic psychoses could be curtailed, and also the elaboration of differently caused toxic psychoses. Drug addiction may be regarded as an expression of compulsion neurosis in many cases, but this is not suggested in the otherwise adequate account given of this. If the book is to be widely used in England a section as to our recognised means of mechanical restraint, which differ from those described, and the legal precautions in using them and seclusion, should be added; and modes of certification and limitations in treatment of patients as voluntary boarders also deserve some space, though, perhaps, not much.

For nurses, the chapter on special nursing procedures at the end should be supplemented by another on general nursing for mental and nervous patients, giving information about emergencies such as suicidal attempts, poisoning, and special precautions as to windows and fires. At present these instructions and also directions about feeding, prevention of bedsores, and care of the bladder are scattered amidst the descriptions of special types of illness and unnecessarily repeated. More emphasis should be laid on care as to feeding in general paralysis, and the importance in epilepsy of observing carefully not only the actual fits but prodromal signs and epileptic equivalents.

The book, however, gives a sound survey of the essential features of mental disorders and of the efforts being made to relieve and restore the afflicted to health.

SOME PRINCIPLES OF MINOR SURGERY.

By ZACHARY COPE, M.S., M.D. Lond., F.R.C.S. Eng., Surgeon to St. Mary's Hospital and to the Bolingbroke Hospital. London: Humphrey Milford, Oxford University Press. 1929. Pp. 159. 10*s.* 6*d.*

THE author does not attempt to cover the wide field of minor surgery as a whole, but limits himself to certain fundamental principles, which while elementary are yet of everyday importance. In the first chapter on the use and abuse of antiseptics, the lessons of the war are well summarised. In the consideration given to Dakin's solution, however, we could find no mention of its all-important property of dissolving dead protein material, although the value of clearing a wound of all dead material as a means of sterilising it is fully recognised. Maggots, those admirable scavengers to whom many wounded soldiers owe their lives, have a similar action. In the chapter on the treatment of acute inflammation, admirable on the whole, the author shows undue optimism about the benefit to be expected from vaccines. We find no mention of mercurochrome in this section. The superposed pictures in the chapter on infections in the hand make the text easy to follow. Much industrial disability follows such infections, and is far too often increased by ill-conceived treatment; this chapter is thus of great value to the practitioner. In the section on common sprains more stress might be put on the place of manipulation in treatment. The teaching of minor surgery to medical students is too often left in very junior hands, and the practitioner may never have had the opportunity of studying the principles on which routine procedures are based. These Mr. Cope has presented in a concise and practical form.

LE SYNDROME EPILÉPSIE.

By O. CROUZON, Médecin de la Salpêtrière. Paris: Gaston Doin et Cie. 1929. Pp. 264. Fr.55.

Dr. Crouzon's volume on epilepsy is erudite and comprehensive, yet its perusal leaves a slight sense of disappointment. Filled with an amazing number of facts of observation culled from all kinds of sources, ancient and modern, it seems to fail in the personal element; the reader is neither provided with critical summaries by the author nor apparently with any expression of his own views, based on what must be a wide clinical experience. The ground covered includes everything from the epileptic aura to the social reactions of the patient; the arrangement of material and lucidity of description leave nothing to be desired. But through this literary labyrinth we need guidance; we want the salient features emphasised and the non-essentials put on one side, and we are left to do this for ourselves. A minor note of remonstrance is called for; while numerous references are given a locus in journal or society proceedings, very many more are restricted to the writer's name, and some of these are clearly of importance.

L'ENCÉPHALITE EPIDÉMIQUE: SES ORIGINES:

Les 64 premières observations connues. By Dr. RÉNÉ CRUCHET, Professor in the Faculty of Medicine of Bordeaux. Paris: Gaston Doin et Cie. 1929. Pp. 133. Fr.15.

IN the spring of 1917 Dr. Réné Cruchet communicated to the Medical Society of the Paris Hospitals a paper describing some 40 cases of sub-acute encephalomyelitis which had been under his observation from towards the end of 1915 to the earlier months of 1916, almost entirely among military subjects, and again later in 1916–17 in another region. This little volume contains a detailed account of the cases and a reasoned claim that they belong to the class now commonly termed epidemic or lethargic encephalitis; the argument is perhaps supported by the fact that one of them, seen in December, 1916, later developed the bradykinetic syndrome and is declared to be one of parkinsonism. The remarkable clinical variety and heterogeneousness of the pictures presented by these cases are well illustrated; the author saw the condition evolve in mental, meningeal, convulsive, choreic, hemiplegia, cerebellar, pontine, spinal, and polyneuritic form. Handicapped as he was by the circumstances of the time, it is remarkable that he was able to make as careful an investigation as he did, even if details of a confirmatory kind are sometimes lacking.

Whether this encephalomyelitis of 1915-16-17 was and is a "new" disease is another question.

SINUS THROMBOPHLEBITIS.

By ALFRED BRAUN, M.D., Attending Otolaryngologist, Hospital for Joint Diseases, New York. With 111 illustrations. London: Humphrey Milford, Oxford University Press. 1929. Pp. 269. £2 12*s.* 6*d.*

A beautifully illustrated monograph on the inflammatory affections of the venous sinuses in the dura has for its central thesis the tracing of general sepsis of otitic origin. Sometimes glaringly obvious, at others slight, hidden and elusive, otitis is, mainly for anatomical reasons, a sinister cranial mischief-maker out of proportion to its degree or extent. Accordingly, the reader is introduced, in a section occupying rather less than one half of the book, to a complete anatomical description of vascular mechanisms in connexion with the ear and their immediate and distant relationships. The book is essentially an atlas, for the drawings and diagrams are on a generous scale and the text does

little more than comment on their significant features. The physiology of the dural venous sinuses, and the way in which the venous blood-flow is protected from the aspiratory effects of inspiration is elucidated. Next in order are treated the etiology and pathology of sinus phlebitis, and its semiology and diagnosis; an excellent résumé of the most modern therapeutic technique is furnished in a final chapter of some 60 pages. Among useful practical matter is the description of the Queckenstedt phenomenon as adopted for diagnosis of unilateral sinus thrombosis; the account of the neural complications of the condition is in some respects inadequate (for instance, that of the syndrome of the superior longitudinal sinus), and the data (clinical and spinal fluid) for differentiation from meningitis. The bibliographical references are largely confined to German and American sources.

TRIAL OF JEAN PIERRE VAQUIER.

Edited by R. H. BLUNDELL and R. E. SEATON, Barristers-at-law. Notable British Trials. Edinburgh and London: Wm. Hodge and Co. 1929. Pp. 208. 10*s.* 6*d.*

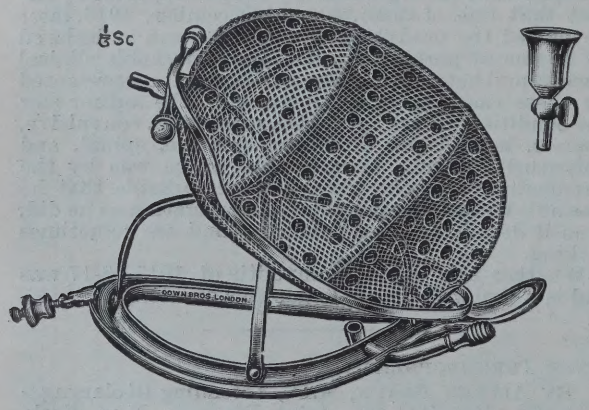
THE evidence upon a charge of poisoning, "of all forms of death the most detestable," is usually circumstantial, not direct. In Vaquier's case it was overwhelming. He became intimate with an Englishwoman, Mrs. Jones, who came to Biarritz for a holiday early in 1904. He followed her home to the Blue Anchor Hotel, Byfleet, which she managed with her husband. Mr. Jones used to take bromo salts (kept in a bottle on the bar-parlour mantelpiece) on the morning after his carouses. One Saturday morning he took his usual dose, complained of its bitter taste, went into convulsions, and died. His medical attendant, Dr. F. C. Carle, diagnosed recent strychnine poisoning, and with great promptness took possession of the bottle of salts, glass and spoon used by the dead man; he also discovered some spilt crystals on the bar-parlour floor. All these articles were eventually found to contain traces of strychnine, and the evidence of Sir Bernard Spilsbury and Mr. John Webster left no doubt of the cause of death. Vaquier, who had been early in the bar-parlour that day, had bought strychnine in London "for wireless experiments"; while in prison he revealed the hiding-place of a further supply of the poison in a toolshed in the hotel garden. He tried to implicate a mysterious third party, and the main feature of his defence was a vigorous attack on the credibility of Mrs. Jones; but there was no doubt of the verdict, and he was hanged in April, only a few months after he first met her.

The editors' introduction is workmanlike and wholly satisfactory; there is no straining after dramatic effect. The main medico-legal interest lies in the comparison of the knowledge, confidence, and precision of modern experts with that of the scientific witnesses in a case of strychnine poisoning such as the Rugeley trial some 70 years earlier. Fitzjames Stephen, who was present during most of the latter trial, gave a contemporary exposition of the effect of the expert evidence against Palmer in his "General View of the Criminal Law of England," a book still well worth studying.

New Inventions.

ETHER INHALER.

THE ether inhaler here illustrated has for its basis the principle of a vapour space which is obtained by superimposing an outer wire gauze cage on a Schimmelbusch face-piece. The gauze is perforated at short intervals, and when in use is covered with one or two layers of lint held in position by a spring. The outer



cage when clipped down holds the face-piece lint in position, and ether is introduced by a small funnel through the perforations in the gauze. A feed pipe is fixed near one end of the face-piece through which oxygen or oxygen and ether vapour can be introduced under the mask. The cage is so constructed that it can be completely removed, and the mask used as an ordinary Schimmelbusch by fixing a wire retaining-ring in its place. When in use anæsthesia can be maintained either by blowing a slow stream of oxygen through ether into the mask through the feed pipe, the proportions of ether and oxygen being ideally maintained by such an apparatus as Mennell's bottle and by-pass, or by gently dripping ether through the gauze by the funnel. In all cases it is advantageous to use oxygen while maintaining anæsthesia. By adding an extra layer of lint to the cage or by covering with a layer of gamgee the anæsthesia can be deepened at will.

Among the advantages of this inhaler are ease and uniformity of anæsthesia, clear view of the face during anæsthesia, and economy in use.

I would like to thank Dr. Z. Mennell, senior visiting anæsthetist, and Dr. G. Edwards, senior resident anæsthetist, of St. Thomas's Hospital, for testing the inhaler and for their very helpful suggestions. The mask is made by Messrs. Down Bros., Ltd., St. Thomas's-street, London, S.E.

Bedford. G. A. METCALFE, M.B., B.Ch.

SKIN FORCEPS.

THE approximating forceps for the skin designed by the late Mr. C. P Childe, of Portsmouth, is of great assistance in avoiding the in-turning of skin edges during suture when completing an operation, but needs the use of one hand in holding the ends together while the stitch is tied. In order to free this hand and so make for increased rapidity in suturing, this forceps has been modified by reversing the spring action so that when the finger grip is released the ends remain in apposition. A certain amount of practice is necessary to get accustomed to the reversed action of the spring, but it will be found that the modified instrument does help in producing a neat and therefore quick-healing scar.

The instrument has been made for me by Messrs. Allen and Hanburys, of Wigmore-street, London.

A. W. HOLTHUSEN, M.B., B.S. Lond.

THE LANCET.

LONDON: SATURDAY, AUGUST 10, 1929.

THE BACTERIOPHAGE AND THE CURE OF DYSENTERY.

EVER since the dawn of the bacteriological era it has been the therapeutic ideal of all who have accepted the germ theory of disease to acquire some means whereby the specific micro-organisms might be destroyed or disarmed and the healthy tissues left unaffected. Innumerable agents have been on their trial, from the crude antiseptics of early days, through the biological antibodies of a later period, to the modern chemotherapeutic stage. All along this steady course of trial and progress may be seen landmarks which indicate certain notable measures of success; some clear and towering, rising erect against the winds of controversy and the corroding influence of time—such as diphtheria antitoxin, the vaccine virus, and salvarsan; others more inchoate, denoting an area whose limits are not yet demarcated—such as the benzidine group of dyes to which the modern trypanosomicidal drugs belong. One agent stands unique amongst these varied bactericidal substances—the bacteriophage described by TWORT and D'HERELLE. It is unique because so little is known of its nature, whilst its effect in the body as a therapeutic agent is still disputed.

The view of this substance, which at our present stage of knowledge seems most rational, is to regard it as akin to the filterable viruses, and as such its study may well lead to important advances in our knowledge of the latter, since it is an agent easily detected and handled and readily submitted to all forms of experimentation. The actively destructive effect of the bacteriophage upon sensitive bacteria is indubitable, and can be readily observed both with the naked eye in mass cultures and under the microscope upon the individual organism. It would therefore seem, upon a priori grounds, that it should constitute an ideal agent for an attack upon micro-organisms in the body, and especially upon those which act upon the surface of the intestine and pullulate in the intestinal canal. In one respect only are inherent difficulties apparent. These lie in the circumstance that when complete destruction of the organisms is not effected, resistant strains of bacteria may develop, which present an interesting analogy to the drug-fast strains of protozoa which have been such a constant source of difficulty in the chemotherapeusis of protozoal infections. What is the exact factor determining the resistance which bacteria may develop against a given phage is at present unknown. It has been widely assumed, and with a good deal of supporting evidence, that it represents a variation in the antigenic constitution of the organisms, in the technical language of the bacteriologist a variation in the "rough" direction. This variation can be brought about by other environmental conditions and may in this instance be produced by the bacteriophage. This is the view adopted in general by HADLEY.[1] However, L. M. BURNETT[2] in a recent paper, has adduced evidence that in the acquisition of resistance no observable serological changes in constitution may take place, the only notable effect being the loss of the resistant bacteria of the ability to adsorb the specific phage in question.

With regard to the clinical problems, which are of more general interest, we publish on p. 273 a contribution by Dr. A. COMPTON to the study of the therapeutic value of the bacteriophage in bacillary dysentery. About this value conflicting reports have been issued, many of which have been noticed in our columns from time to time. Of all diseases those of the intestinal group should be most amenable to treatment by this means, and it may be recalled that it was in connexion with dysentery that D'HERELLE made his initial claims for the practical therapeutic use of the bacteriophage. In general, these claims have been not confirmed, although in a recent communication[3] D'HERELLE announces that "the method has been applied in tens of thousands of cases of bacillary dysentery and recovery always took place in 24 hours." We are not aware that the collected details of such cases have ever been published. Dr. COMPTON bases his report upon 66 cases of Egyptian dysentery which had been diagnosed "cytologically" as of bacillary origin. The type of infection is stated to have been predominantly of the Hiss variety, and the bacteriophage in use a polyvalent strain including one variety of D'HERELLE'S own isolation and apparently of high potency. The cases were not observed directly, but were under the control of outside doctors. If we examine the reported results initially, we find a maximum beneficial effect to have been obtained in 35 out of 66—i.e., just over 50 per cent. The criterion adopted is the diminution in the number of stools, which fell to 2 to 3 per day on the second day of treatment, and (presumably) uninterrupted recovery thereafter. The ordinary saline treatment was carried on coincidently with the specific measures. Such a result, taken at its face value, appears to be excellent, but it is a constantly recurring lesson in medicine that face value results are not always safe guides to the value of medicaments. Only rigidly controlled parallel series of treated and non-treated cases will give information of real and lasting value. Dysentery is by no means always a serious and progressive malady. Anyone who has had experience of a considerable epidemic of it knows that in many cases the infection may be self-limiting and recovery may occur without any specific treatment. It is not suggested that a large proportion of Dr. COMPTON'S treated cases are likely to have been in this category, but the possibility represents an interfering factor, whose extent it is not easy to estimate. The treatment did not appear to affect the well-known influence of age as a prognostic factor in this disease. Phage or no phage, the younger the patient the greater the mortality. There is still lacking a sufficient and clearly cut investigation of this important question which will enable us to judge of the value of the bacteriophage in dysentery. The usual criticism of negative results, that the strain of phage was not of maximum virulence, is a weighty one which cannot be disregarded. Since the evidence of the value of this treatment is anyhow not so convincing as to make it inhuman to withhold it from any sufferer, it would be a real service to therapeutics if those who, like Dr. COMPTON, have access to an unlimited number of cases of bacillary dysentery would treat alternate

[1] Hadley: Jour. Infect. Dis., 1928, xlii., 265.
[2] Burnett: Jour. Path. and Bact., 1929, xxxii., 349.
[3] d'Herelle: New Eng. Jour. of Med., Feb. 21st, 1929.

cases with the bacteriophage and the others by any one of the approval methods, giving in each case a detailed bacteriological examination before and during treatment and chronicalling the clinical course. Only by such an investigation can the question be solved which ten years of scattered observations and uncontrolled reports, suggestive though they may be, have still left unanswered.

THE EPIDEMIOLOGY OF MEASLES.

SINCE cholera, small-pox, and virulent scarlet fever became negligible factors of exanthematic child mortality, measles has been a prime object of concern to the health departments, sharing precedence with whooping-cough and diphtheria. The epidemiologist has been preoccupied by its curious manifestations for even longer. When a locality is hit by one of the periodical waves of measles the child population is always extensively involved, and the evolution of each outbreak is not influenced by any counter measures which have hitherto been tried. The illuminating studies of mass infection and immunity which have resulted from bacteriological and immunological discoveries in diphtheria and scarlet fever have left the epidemiology of measles no further advanced. Almost the only method of investigation open to us in measles is the statistical one which, though it can achieve little unaided, can be invoked to confirm or refute laws framed on other evidence. We welcome, therefore, an attempt to explain the well-known phenomena of the epidemicity of measles by the theories of "latent epidemisation" and "latent immunisation"[1] made in a recent study by Dr. PERCY STOCKS and Miss MARY KARN.[2] To this end a most elaborate procedure has been adopted. The detailed records of all cases of measles notified in the metropolitan borough of St. Pancras during three years from March, 1924, to March, 1927, have been studied, as well as the statistics of deaths and notifications since 1916. The living population at each age under 12 in St. Pancras at the beginning of the three years' period was estimated by applying the ascertained births and deaths to the census data, and the number of children at each age under 10 who could be regarded as definitely immune from recognised measles was ascertained from the statistics of notifications from 1916 to 1924. By laborious adjustment it was possible to estimate at any one time during the three years' period the separate numbers in two groups—viz., those who had already been familially exposed to measles during the period (the selected population), and those who had not (the residual population)—and to divide the former into those who manifested immunity after the lapse of varying periods of time and those who did not. Investigation of the true infectivity of the virus, as distinct from its apparent infecting power, and also the relation of this quality to different meteorological conditions, were attempted.

The conclusions arrived at are as follows: (1) The epidemic phenomena of measles are inexplicable if experience of an attack of recognisable measles is the only way of acquiring immunity; (2) a study of the incidence of measles at different times in the selected population, as compared with the residual population, shows that individuals in the former group acquire, without manifest sickness, a degree of immunity in excess of that exhibited in the latter and tending to diminish with the lapse of time—probably vanishing in most cases within two years; (3) this accounts for the observed fact that many children assumed to have no acquired immunity go through an epidemic without sickening, and it may explain the biennial periodicity of the disease; (4) the retardation of spread from the later foci of an outbreak, as compared with those at the onset, may also be explained by latent immunisation; (5) the *apparent* infectiousness of measles varies from a maximum at the onset of an epidemic, falling throughout its evolution to a minimum at the end, gradually increasing again in the course of the non-epidemic interval; (6) "all the changes noted in apparent infectiousness are explicable by immunity changes alone, excepting the *sudden* fluctuations, which must be attributed to changes in facility of transmission," such sudden fluctuations occurring mostly at the commencement of large epidemics; (7) the curve of the epidemic can be almost completely explained "by the concept of an active plus latent immunisation of the child population on the one hand, and changes in facility of transmission of the virus by droplet infection from cases or carriers to other persons coming in contact with them on the other," the latter phenomenon being possibly related to certain atmospheric states.

It will be seen that Dr. STOCKS and his collaborator have succeeded in applying to the behaviour of measles the laws for which bacteriological and immunological support can be adduced in other communicable diseases. Confirmation of the investigation is not likely to be forthcoming at any near date because of the labour involved, the statistical skill required, and the paucity of data available. Incidentally it may be noted that an inquiry of this kind might have been even more fruitful in a more sparsely populated area such as Renfrewshire, where measles was notifiable and carefully carded for more than 20 years, and where extra-domiciliary infection was proved to be much rarer in villages than in towns. A test that may be applied immediately, however, is the experience of practical workers in the field of the communicable diseases. Is there even circumstantial evidence of the carrier state or of anomalous forms of measles comparable with that which can be adduced to support the theory of latent epidemisation and immunisation in other zymotics, whether of known or unknown origin? It must be confessed that there is very little. When inquiries are pressed they rarely fail to trace measles to another recognisable, if unrecognised, case. Only very occasionally does one see the crossing of a ward, for instance, by a child with coryza, Koplik's spots, and no more than a slight blotchiness behind the ears or down the side of the neck, in contrast with the experience in relation to diphtheria and scarlet fever. It is, of course, possible to argue that the signs of anomalous measles resemble so closely those of catarrh of any other origin that the infection is likely to escape diagnosis until a specific test is devised, but if this were so measles should be much less easily traceable than it is. If, then, latent infection occurs, it is without demonstrable association with modified forms of the disease. On the other hand, the general behaviour of epidemics of measles, noted by the late Dr. JOHN BROWNLEE fits well with the new hypothesis, as does the phenomenon of apparent non-infectiousness in hospital wards during inter-epidemic periods mentioned by the same observer. Dr. STOCKS and Miss KARN have produced what is in many respects the most valuable contribution to the study of measles which has appeared since BROWNLEE's ingenious, if rather fanciful, work on the periodogram

[1] See THE LANCET, 1928, ii., 233.

[2] A Study of the Epidemiology of Measles. Annals of Eugenics, vol. iii., Parts iii. and iv., October, 1928.

THE CORONER'S DISCRETION.

WHEN Parliament three years ago enacted that every coroner should be paid by salary instead of by fees, it was hinted that the fee system had been a possible inducement to coroners to multiply inquests. In introducing the Bill which effected the change, Lord CAVE expressed the opinion that the suggestion was unfounded. In any case the change in the law was welcome. The Chalmers Committee's report, issued in 1910, observed that a coroner had often more trouble over holding a preliminary inquiry than over the actual inquest; if he satisfied himself that there was no public ground for holding an inquest and thereby saved unnecessary pain and distress to relations of the deceased and expense to the community, it was rather unfair that he should, so to speak, be fined for his good conduct; "it is not right," added the report, "to put a coroner (and still less his officer) in the position of having a pecuniary motive for holding unnecessary inquests." The desired reform—in the Coroners (Amendment) Act of 1926—gave the coroner a statutory encouragement and authority to dispense with inquests. Already the critics are asking whether inquests are not now too few.

Statistics are here more than usually inconclusive. The latest available from the Home Office deal with the year 1927 and so cover only a few months of the operation of the Act of 1926. In 1927 there were 60,511 deaths reported to the coroner; 12,108 of these were deaths of lunatics and mental defectives in nstitutions. In only 345 of these institution cases was an inquest held, but, in view of the medical information no doubt available as to the condition of the patients, the small proportion of inquests is easily understood. Against the total of 60,511 deaths reported to the coroner in 1927 we have the figure of 32,439 inquests held. For what the comparison may be worth, we can look back at the figures a few years ago. For 1924, for example, the corresponding totals of deaths reported and inquests held were 53,062 and 31,705. In the past few years, it seems, the number of inquests has remained fairly stationary while the number of deaths reported has considerably increased. It would be most unsafe to dogmatise upon such material; local variations are due to accident and to the varying exercise of the individual coroner's discretion. The 1927 tables show that in one jurisdiction a coroner happened to hold an inquest in every case of death reported to him, while, in the same period, a coroner in another jurisdiction was content to hold only one inquest for every five such deaths. These differences are inevitable. They were noted by the Chalmers Committee in 1910 when it was found that in one part of London the percentage of inquests to deaths reported was 59 while in another it was 81. It has probably been the experience of many general practitioners that on occasions when they regarded an inquest as unnecessary an inquest was nevertheless held; conversely, when, so far as is within their power, they have indicated the desirability of clearing up some puzzling or suspicious symptom, the coroner has dispensed with a formal inquisition. The coroner's decision not to hold an inquest is an act of executive rather than judicial discretion; the exercise of such discretion, conducted in private rather than in public, may find critics; it can at least be hoped that there will be the maximum of agreement between the coroner and the medical practitioner. The 1926 Act and the 1927 Regulations, which the late Sir George Greenwood and his supporters thought so inadequate a protection against either foul play or premature burial, vastly improved the old method of reporting suspicious cases to the coroner. The new system, involving perfect confidence between coroner and practitioner, is on its trial. The public, puzzled by recent exhumations of bodies and reopenings of inquests for which neither coroner nor practitioner is in any way to blame, may feel vague misgivings as to the modern working of an ancient tribunal. If at any time it were disclosed in some sensational case that the coroner had neglected or undervalued the practitioner's warning, Parliament might be pressed to limit the discretion which it conceded in 1926.

Annotations.

"Ne quid nimis."

THE EXPERIMENTAL METHOD IN PSYCHOLOGY.

IT is the fate of any science which has one hand on the human heart and the other on the laboratory instrument to promise more than it can give in respect to the problem of mind. The extraordinary achievements of the scientific method in the field of physics and chemistry promised equally glittering prizes to those who entered the lists of psychology with stout hearts and sharp instruments. With the aid of physiology, psychology has now definitely emancipated itself from metaphysics, and has sought to adopt methods comparable to those used in the study of physiology of the special senses, where a local problem can be, to some extent, isolated. Where the reactions of the whole organism are involved, however, dealing with a problem in a circumscribed or local way becomes impossible. It is to this difficulty in experimental psychology that Mr. F. C. Bartlett devoted his Presidential address, delivered in Cape Town on July 26th to the Psychological Section of the British Association. He has endeavoured in a historical survey to show that such idols in the temple of psychology as G. T. Fechner and H. Ebbinghaus have in reality not served their science too well in stressing the great importance of the stimulus in the reactivity of the organism. In the study of pure sensory experience, if such experience can be divorced from all others, the relationship of stimulus, however simple to response, can be studied with the hope of realising simple dogmatic laws. But no sooner do the processes studied leave the field of simple sensibility and begin to involve more complex functions and the attitudes of the organism as a whole, than the qualifications limiting results grow alarmingly and the method exhibits its shortcomings. In such complex "sets" the stimulus does not entirely govern the response, but merely acts as a trigger mechanism setting free propensities and activating large psychological systems or attitudes. The fault lies in the attempt on the part of the experimental method to study the organism too much away from the context of ordinary biological situations. The nonsense syllable method for the study of memory and retentiveness is a convenient example. In most, if not in all living situations, the stimulus is but a fraction of a total system of vectors. Mr. Bartlett notes that the physiologist "rightly lays the chief emphasis upon the local response mechanism, and for obvious reasons shrinks from speculations about the central processes until he knows as much as can be learnt about the peripheral functions and their mode of operation." But since it is these central processes that are the primary concern of the psychologist, the latter can learn little by the study of the peripheral events and can safely leave them to the neurologist.

Strangely enough, as Mr. Bartlett acutely observes, the very protagonists of the experimental method are the persons most prone to commit the error of what may be called unbridled "a priorism" in claiming more for the method than it can with its limitations produce. The theory of Gestalten, the Spearman theory of two factors, Jaensch's deductions on character from his experiments on "Eidetic Images," and lastly the easy acceptance of the conditioned reflex as the new panacea, are examples of the dangers of attempting to stretch the experimental method to cover the whole field of the mental life. Behaviourism, and the conditioned reflex which has become the irreducible unit of this valuable experimental approach to behaviour, are illustrations of the

dangerous consequence of the absence of logical scrutiny at all stages in the development of a new approach. So far has the enthusiasm for the conditioned reflex gone that Pavlov himself speaks of "search reflexes." Could the mixture of logical categories go further?

Psychology must concern itself with the highest reactions of the organism as a whole, and must in consequence take account not merely of the stimulus and the final response, but the whole of an organism historically determined, and at all times and at all points saturated with affect and governed by those complex methods of adjustment and growth which we term the instincts. In short, if psychology is to retain the respect of the humanist, it must pursue to some extent the clinical method. Much therefore can be added to academic psychology if it allies itself to psychopathology. It is in this field that the processes of fragmentation are best studied, since they come into being in response to some strange biological necessity. The molecular method can be pursued by those who prefer the artificial atmosphere of the laboratory, but for psychological workers. Nature provides suitable material nearer at hand.

THE PATHOLOGY OF GASTRITIS.

CONCEPTIONS of gastritis have altered a great deal in the last few years. The older pathologists recognised the gross lesions caused by corrosives like carbolic acid and irritant poisons like alcohol, but the finer forms were lost in the changes produced by post-mortem degeneration and self-digestion of the stomach. In their study of pathology in the living, surgeons found ulcers and growths affecting the stomach, but gastritis as such was unsought for, and thus passed out of practical consideration. Further examination of the material obtained by resection of the stomach has, however, revealed changes in areas other than those invaded by growth or eroded by ulcer. The newer methods of investigation, especially histological observations on portions of the stomach fixed at body temperature, immediately after removal at operation, have thrown a new light on conditions of chronic gastritis. Konjetzny[1] found in such material that gastritis was present in every case of gastric ulcer examined, whilst in every case of duodenal ulcer there was gastritis as well as duodenitis. In 90 per cent. of stomachs resected for gross carcinoma he found evidences of gastritis in other parts of the stomach. Although Konjetzny believes that the gastritis is the cause of ulcer and of carcinoma, most workers see in these results at most the frequent association of gastritis with ulcer and cancer, and leave open the question whether the gastritis is primary or secondary. The great difficulty is that both gastritis and early carcinoma may be latent, and give no clinical evidence of their presence, so that microscopy is required to settle the question definitely. X rays may sometimes indicate gastritis by showing alterations in the contour of the mucous folds outlined by barium, but a negative result does not disprove its presence. It has long been recognised that inflammation of the lining of the stomach and duodenum may occur after severe burns on the skin, and lately F. Kauffmann[2] has investigated more exactly the importance of products of degenerated tissues in causing endogenous gastritis. In experiments on dogs he produced a dermatitis by sunlight treatment, and in other instances a sterile abscess by subcutaneous injection of turpentine. The sterile abscess or inflammation of the skin served as a source of the toxins derived from breaking down of proteins. The results observed were, besides degeneration in other organs (liver, kidney, and heart muscle), fatty degeneration of the gastric mucous membrane, especially in the pyloric region. A secondary inflammation in the submucosa was often found as well. All forms of degeneration were observed, from a simple fatty change or mucous catarrh to a severe erosive gastritis, implicating also the muscularis mucosæ and connective tissues of the submucosa. These inflammatory changes are brought about by the toxic products derived from protein degeneration in other parts of the body. Toxic or endogenous gastritis, he holds, may thus arise during infectious disease, or from the presence of inflammation in organs far removed from the stomach. A degenerating carcinoma in one part of the stomach may give rise to gastritis elsewhere in the organ. Bacterial toxins, which have hitherto been regarded as the essential causes of these lesions, may be found to play a less, though by no means negligible, part.

[1] Konjetzny, G. E.: Handbuch d. spez. pathol. Anatomie u. Histologie, Berlin, 1928, iv., ii., 892.

[2] Klin. Woch., 1929, viii., 1380.

THE AFTER-HISTORY OF ATHLETES

"It is not perhaps too confident a statement that a properly trained person, man or boy, need never fear cardiac strain." (Allbutt.)

THIS sentence expressed concisely the attitude of a large section of the medical profession in 1909 to the question of possible injury to health resulting from severe physical exercise. Since that time no facts have come to light which would render the statement invalid; on the contrary, such evidence as there is—part of it was discussed in our columns last month—all tends to confirm the belief expressed twenty years ago by Sir Clifford Allbutt. In view of the increasing number of persons of all ages who regularly take part in athletics, the subject will continue to arouse interest. Investigations are still being put in hand all over the world, and carried out mostly upon groups of men who have specially prepared themselves for some special (and short) period of exertion—for example, a University Boat Race or Olympic Games—and have been limited to an examination of the subjects shortly after the end of the contest. In the *American Journal of Medical Sciences* (July, 1929) an account is given by Dr. Burgess Gordon and the late Dr. J. C. Baker of some observations on a trans-continental foot-race. Such a race provides unusual opportunities for studying the reactions of the body to severe effort continued for a long time. It also provided in this case an opportunity for the study of the effects of daily severe effort upon the comparatively untrained as well as upon the trained subject. The entries numbered 199, the eldest being 64, the youngest 17. Examination before the race showed that about 50 per cent. were physically under-developed, 3 per cent. suffered from respiratory infections, 4½ per cent. showed gastro-intestinal symptoms, 8 per cent. showed albuminuria. During the race only 7 competitors dropped out on account of exhaustion; these were unfit at the start and were untrained. Only 57 finished the full distance. Those who retired did so for a variety of reasons. "Shin splints"—a form of myositis with periostitis in the anterior tibial region—together with financial difficulties accounted for most of the withdrawals. The total mileage was 3484, and the daily average 44·2 miles. At the finish only 14 showed signs of fatigue; all the others were in excellent health. A careful physical examination carried out three days after the race showed no cardiovascular abnormalities. A striking fact is that 65 per cent. of those examined suffered from tonsillitis. Twelve months after the finish of the race inquiries were made as to the condition of the competitors; all the replies indicated that so far from being injured, they felt themselves to have benefited from the race. It is, of course, too early to judge of the effects of such a sustained severe effort on the health of the competitors, and it is to be hoped that careful records will be kept of the later history of those who took part in the race to add to those now available. We have already referred to the study by Morgan of the lives of University oarsmen (1829–69), and to his conclusion that the deaths definitely due to cardiovascular causes were in exactly the same proportion

as in the general population. Meylan, who investigated the history of Harvard oarsmen, came to similar conclusions. R. W. Michell, of Cambridge, who examined 1200 rowing men and 410 players of Rugby football, found cardiac dilatation which persisted after exercise only in men with a history of either diphtheria or rheumatic fever, who had taken strenuous exercise while untrained. It is clear that on physical grounds no objection can be made to a habit of life which involves strenuous exercise, provided the individual is physically sound and properly trained. The available evidence is almost entirely confined to men, but there is no reason to doubt that it would be confirmed by investigations of the after life of women athletes. The various federated associations concerned with promoting sporting events for women in France have instituted a medical service and propose to insist on a certificate of fitness before candidates are allowed to enter for any event; this precaution, if followed up, might well form the basis of valuable statistical information. The efforts made to collect evidence to prove that exercise does no physically observable harm is a sign of the conviction, difficult to prove, but widely held, that a condition of trained physical efficiency not only leads to happiness and well-being, but goes hand in hand with general and especially mental efficiency.

OPTOCHIN IN OPHTHALMOLOGY.

CUPREINE is an alkaloid which occurs with quinine in cuprea bark, and the important property of ethylhydrocupreine is that it destroys pneumococci. It has been used medicinally in pneumonia, but it is mainly employed as the hydrochloride salt (optochin) in a one or two per cent. solution in eye affections, especially in pneumococcal ulcer of the cornea. Unfortunately its employment in this disease is attended by much pain. Dr. S. H. Browning, at the recent Oxford Ophthalmological Congress, suggested that it should not be applied direct to the cornea after it has become infected with the pneumococcus, but that the parasite should be attacked while it is still in the lacrymal sac, before the cornea has become infected. The popularity of optochin among ophthalmologists has suffered from its chemical name, for it is generally supposed that it is a derivative of copper and is therefore a dangerous substance to use on the eye. In fact copper does not enter into its composition at all, and the patient may be assured that the pain caused by its application does not indicate damage to delicate tissues.

RENAL EXTRACTS IN THE TREATMENT OF NEPHRITIS.

THE outlook in chronic nephritis is, as a rule, so bad that anything which offers hope demands every consideration. The possibility of a new therapeutic approach was mentioned in an annotation in our columns not long ago,[1] when it was suggested that injections of phosphate may perhaps be found useful. We observe that another line of possible treatment is being explored by Prof. Stejskal of Vienna, who has published[2] a small series of cases of advanced renal disease in which injections of fresh extract of kidney were given. Organotherapy has been abused so often that attempts of this kind are naturally received with reserve; but Stejskal's idea is neither altogether new nor devoid of foundation. A similar experiment was made as long ago as 1892, by Dieulafoy, and the theory of an internal secretion of the kidneys dates back to Brown-Séquard. It has often been suggested that in contracted kidney broken-down renal parenchyma is absorbed into the blood, and that such products are responsible for the high blood pressure and other changes found in this condition; and investigation has in some respects confirmed this hypothesis. Goldzieher[3] and others, injecting emulsions of kidney substance subcutaneously into rabbits, produced albuminuria and casts in the urine, and sometimes death. At the same time the adrenal bodies were found to be markedly enlarged with an excessive hyperplasia of the medulla. These and other experiments led him to the view that resorption of diseased kidney tissue caused an over activity of the adrenal medulla which was an important factor in the rise of blood pressure in cases of contracted kidney. Much may be said for this opinion; thus we know that if serum from a nephritic patient is added to a solution of adrenalin the pressor effect of the latter is considerably increased. Again, it is possible to have a very high blood pressure without obvious nitrogen-retention, which is evidence against the alternative hypothesis that such retention is alone responsible for the hypertension. Possibly both factors are concerned in producing so-called interstitial nephritis; thus primary impairment of the function of the kidney may lead to resorption of diseased renal tissue, which increases the liberation of adrenalin, whilst the subsequent accumulation of nitrogenous waste products in the blood may cause stimulation of the sympathetic, which acts again upon the adrenal medulla. At all events, whatever may be the connexion between renal damage and hyperpiesis, Stejskal is able to record a remarkable reduction in blood pressure following injection of extracts of kidney. He used a sterile watery extract, containing as far as possible the unchanged renal lipoid bodies, but almost practically free from protein. This was injected in quantities of 2 to 5 c.cm. intradermally (so that absorption should be gradual) once or more into ten patients suffering from advanced contracted kidney, some in the late stages of uræmia itself. Injection was always followed by a fall in blood pressure, which was gradual and progressive, and in some cases this was persistent. This fall was not seen after injection of other tissue extracts and only occurred in cases of renal hypertension—that is to say, the renal extract appeared to be truly "organ-specific." The falls observed in the cases recorded were of 80, 40, 70, 120, 120, 90, 130, 90, 80, and 120 mm. of mercury—an average of approximately 100 mm. All were cases with very high values before the injection and obvious signs of terminal nephritis. Symptoms other than hypertension were not consistently affected, nor did the outcome of the disease seem to be much influenced, but the figures are certainly noteworthy. The theory is advanced that the fall may be due to some effect on the blood-vessels, perhaps of some hormone in the extract, which relaxes their powerful tonic contraction.

THE INDUSTRIAL HEALTH RESEARCH BOARD

THE change of title announced in its ninth annual report[4] by the Industrial Fatigue Research Board indicates that in future its object will be to study not merely the negative or pathological aspect of industrial activity, but also its positive side of promoting and maintaining good health. This step is in accord with the trend of modern medicine, for the doctor attempts to teach the patient how to be well and keep well, rather than to seek for cure of ills earned by wrong living. The body to be known as the Industrial Health Research Board came into existence to follow up war-time research into the evil effects of long hours and heavy work, but has now as its primary aim the acquisition of knowledge about conditions and methods of work most favourable to the workers. A glance at the variety of inquiries recently completed or in progress displays the wide scope of the Board's activities. Hours of work, the heating and ventilation of factories, vision and lighting in relation to output, the effects of noise

[1] THE LANCET, July 27th, p. 183.
[2] Stejskal, K.: Med. Klin, 1929, xxvii., 1015.
[3] Goldzieher, M.: The Adrenals. London, 1929, p. 223 et seq.
[4] Ninth Annual Report of the Industrial Health Research Board to Dec. 31st, 1928. H.M. Stationery Office. 1929.

and vibration, accident causation, labour turnover, repetitive work, vocational guidance and selection, sickness prevalence among printers, cardroom operatives and miners, humidity in mines, weight carrying, the physiology of exercise, the transfer of acquired skill, and the relation of age to the acquisition of dexterity, are all included among the subjects receiving consideration. Some activities concern problems of wide industrial importance; for others the material has been submitted by Government departments and industrial associations, while yet others are experimental researches carried out in laboratories. Knowledge is being gained; it remains to bring it to the attention of industry for practical application, for it should bring with it not only increase in health for the great working population, but increase in productive activity and wealth for the nation.

A notable example of the type of information made available by the publications of the Board is the report just published, dealing with monotony in work.[5] The investigation was made on workers employed on such repetitive processes as filament winding, soap wrapping, chocolate packing, and tobacco weighing. Boredom was found to be a fairly general experience; only about one quarter of the workers escaping it. Boredom was held to be responsible for reducing the rate of work by from 5 to 10 per cent., and was more prevalent when operatives were paid on a time-basis than on piece-rates. It caused irregularity in rate of work, and affected particularly workers of superior intelligence whose productive efficiency was above the average. Workers doing entirely automatic work did not suffer much from boredom, for their thoughts could safely be detached from work and directed to more interesting subjects; it will be remembered that Auguste Comte claimed that chances for philosophic thought lay in such occupations, and looked to find pupils among such operatives. Boredom occurred most in semi-automatic processes which require enough attention to prevent mind-wandering, but not enough for the complete absorption of mental activity. Continued exposure to monotonous work causes adaptation, so that what is initially tedious and unpleasant may finally be tolerated or even mildly enjoyed. The suggestion made in this report that, by completing the mechanisation of the task, boredom is avoided and thought stimulated is decidedly unexpected. On this assumption mass production by repetitive work, when carried to a fine art, would cure the very trouble it has always been accused of causing. Here is a problem, elusive and difficult of approach, wherein progress must necessarily be slow; but the theories now put forward are ready for practical trial.

THE EVOLUTION AND PURPOSE OF THE LARYNX.

SOME years ago Mr. V. E. Negus set himself the task of tracing the reasons for the existence of the larynx and the steps of its evolution in response to the many demands made upon it. He started upon his researches without preconceived ideas, and allowed them to follow the directions which seemed to be indicated by his attempts to correlate structure and function of this organ throughout the range of animal life. He has examined the anatomy and physiology of the larynx, with its associated organs, from its earliest inception in the lung-fishes, and on this study has founded theories which he expounds with good argument in a recent publication.[6] The superficial idea that the larynx is "the organ of the voice" is obviously untenable from the evolutionary point of view. The primitive larynx is a valve placed on the floor of the pharynx at the top of the pulmonary outgrowth to prevent water and food from entering the lung sac; in the most primitive forms it is surrounded by a muscular sphincter only, but in some lung-fishes dilator fibres are also present, and in the axolotl lateral cartilages have appeared with the function of keeping the valve open when air is entering the sac. From this point Mr. Negus traces the evolution of the larynx with a wealth of detail which is of absorbing interest. The nose is primarily intended for olfaction; in fish, with few exceptions, it does not communicate with the mouth, but in air-breathing animals it is necessary for olfaction that air should pass through the nose. In order to retain this passage of air while the mouth is open during eating the epiglottis has been developed, and all keen-scented animals have a big epiglottis lying normally in contact with a long soft palate. As a secondary function in many rapidly running animals the long epiglottis reaching into the nasopharynx is valuable for maintaining a straight and open air-way to the lungs. In many lowly animals the larynx is of a domed shape, a configuration which prevents the entrance of air except when muscular action provides an opening. Some of the higher animals possess secondary valvular folds formed by specialisation of the thyro-arytenoid muscle; these prevent the entrance of air with the minimum expenditure of muscular energy, and the best instances are to be found in arboreal animals, particularly actively climbing monkeys, and in the higher apes and man. Mr. Negus believes that the primary function of these valves is to hold the thorax rigid, and so to give a fixed point of origin to the pectoral muscles. These valvular folds, which are the vocal cords of man, we owe to our arboreal ancestry; they have been further developed by the specialised use of our fore-limbs, and their employment for speech is a secondary function. These theories and other matters relating to the forms and functions of the larynx throughout the animal kingdom are supported by careful observations minutely recorded. The book gives evidence of much specialised knowledge as well as of original thought, and will be of interest to biologists as well as medical men.

RETINAL ADAPTATION AND FLICKER.

THE fact that the sensation produced by a visual stimulus persists after the stimulus itself has come to an end has long been recognised. In 1765 D'Arcy made the first recorded attempt to measure the persistence of an image by the rate at which a burning stick had to be whirled before it would give an impression of a continuous circle of light. The modern method is to fix a rotating disk, with one or more sectors cut out, in front of a source of light and increase the speed of its revolution until the flickering impression gives way to a sensation of continuous light. A recent report to the Medical Research Council shows that appreciation of rapid stimuli varies in different regions of the retina and is dependent on the condition of adaptation of the eye. To produce the sensation of flicker the subject being experimented on is seated in a cubical box with a minute window through which he can view a test patch, either directly (foveal vision) or at an angle (peripheral vision); the sectored disk is then made to rotate in front of a gas-filled lamp. The number of interruptions per second necessary to do away with flicker is known as its "critical frequency" and this varies according to the state of adaptation of the eye, according to the region of the retina on which the light falls, and according to the illumination of the test patch and its surroundings. During dark adaptation with high illumination of the test patch the critical frequency falls With low illumination of the test patch for the peripheral retina the critica

[5] The Effects of Monotony in Work. By S. Wyatt and J. A. Fraser. Report No. 56. Industrial Fatigue Research Board H.M. Stationery Office. 1929.

[6] The Mechanism of the Larynx. By V. E. Negus, M.S. Lond., F.R.C.S. Eng., Junior Surgeon for Diseases of the Throat and Nose, King's College Hospital, London. With an Introduction by Sir Arthur Keith, F.R.S. London: Wm. Heinemann, Ltd. 1929. Pp. 528. 45s.

[1] Privy Council: Medical Research Council, Special Report Series No. 134. Reports of the Committee on the Physiology of Vision. V. The Adaptation of the Eye: its Relation to the Critical Frequency of Flicker. By R. J. Lythgoe and K. Tansley

frequency during dark adaptation rises. In the first case the cones are functioning, in the second case the rods. The brightness of the area surrounding the test patch is the most important factor in determining whether the critical frequency is of the rod or cone type. The outcome of investigations pursued by this method is to confirm what is already known in connexion with the phenomena of flicker. The "duplicity theory" of a double mechanism depending on the rods and cones respectively is assumed, and receives support from the results obtained. A novel suggestion based on the critical frequency of the retinal periphery in bright light is that the peripheral cones are functionally not identical with the foveal cones. If this is confirmed it will be in accordance with the known anatomical differences of the cones in the two regions.

AVERTIN FOR TETANUS.

The first instance, so far as we are aware, of the employment of avertin to control the spasms of tetanus, is related by Prof. Fritz Momburg and Dr. E. Rotthaus.[1] The drug appears to have been of the greatest possible service. The history of the case is briefly as follows: On July 21st, 1928, a girl of 7 fell down and got a small wound in the left patella. On July 28th, after an incubation period of only seven days, convulsions and stiffness of the limbs began. On the 29th severe trismus, opisthotonos, and rigidity of limbs supervened. Under avertin narcosis (0·17 g. per kilo) the wound was excised. Tetanus antitoxin was given intramuscularly, intravenously, and intrathecally to the extent of 20,000 units. During the next six days another 30,000 units were injected. During the 12 days following the operation the child was put under the influence of avertin 20 times. On two of the days she was made narcotic with avertin no less than three times. The dosage ranged between 0·1 g. and 0·18 g. per kilo of body-weight, and altogether she received 63·8 g. The worst days were the sixth to eighth, and the most distressing symptom was the terrible diaphragmatic cramp. For control of this, chloroform and oxygen were employed, and several times respiration ceased entirely. From the fourteenth day onward there were no convulsions, and the trismus diminished. On the forty-ninth day the child was discharged well. The authors are of opinion that the relief afforded by avertin during the acute stages of the illness was greater than any they had ever witnessed from other sedatives in similar conditions.

ANTENATAL CLINICS.

AN official memorandum[2] outlining the organisation of a modern antenatal clinic, and the minimum scope of its activities, is likely to be scrutinised with jealous care, for this welfare scheme has not been accepted so cordially by doctors, midwives or, indeed, by patients, as have the infant clinics. In fact, the exhaustive scheme accepted by the Representative Meeting of the British Medical Association last month mentioned the existence of antenatal centres only to express firmly the opinion that the usual routine work done there could be done quite as well at the consulting room of the doctor or at the home of the patient. Since, however, a national scheme which might render antenatal centres superfluous is as yet only in the stage of a resolution of the Representative Body, the views of the Ministry of Health on the organisation and duties of these centres are welcome.

No encroachment on professional interests is threatened by the memorandum; on the contrary, emphasis is laid on the advisory nature of the clinics, and on the desirability of restricting their work rigidly to the supervision of normal pregnancies. It is reasonable to demand that supervision must be adequate, since a false sense of security may do even more harm than neglect. A distinction made by the Ministry of Health between consulting clinics, staffed by expert obstetricians, for which no rules are laid down, and examination clinics, such as those subsidised by voluntary organisations or municipalities. The medical officer of one of these examination clinics, whether giving whole or part time service, should be trained and experienced both in obstetrics and antenatal work, and should have held a resident appointment in a maternity hospital or at least three months' post-graduate instruction at a recognised school. His first duty is to advise patients coming independently or sent by health visitors to book their confinements with doctor or midwife forthwith. When midwives send cases they are to be encouraged themselves to attend, and to make the necessary examinations under supervision, so as to avoid duplication, but every patient should be examined by a doctor at least twice during pregnancy. The suggestion is made that on booking a case the midwife should ascertain the name of the doctor the patient would wish to employ in case of need during labour, and should inform him of this possibility, and of the antenatal condition. Doctors may not altogether welcome a form of contingent booking which morally binds them to be available if difficulties occur, but on the other hand an unexpected summons to an unknown case may be even more unsatisfactory. Whatever the outcome of the labour, the midwife is to be asked to report to the clinic on its course, the local authority being advised to offer a small fee for a courtesy which is indispensable to the collection of reliable statistics. When a doctor has been booked for the confinement, and his patient attends the clinic, no examination should be made without his consent; he also is to be asked to report to the medical officer on the labour, no fee being mentioned in this connexion. Since, however, it is laid down that a doctor wishing to transfer the whole or part of the antenatal care of a patient to a clinic should be able to do so, he stands to gain so much from the facilities to be offered, which include reports on abnormal cases, that he is not likely to grudge information in return.

The reservation of beds in hospitals for abnormal maternity cases referred by clinics as well as by doctors is recommended in the memorandum; reciprocal advantage is an arrangement for patients living far from the hospitals where they intend to be confined to attend the nearest clinic during the whole or part of their pregnancy. One brief sentence implies the desirabliity of the extension of the maternity service throughout the country on lines already followed by the Hampstead local authority—the provision of obstetric consultants. The minimum number of routine examinations, according to the schedule, works out to nine or ten in normal cases, between the first examination at the sixteenth week and the confinement. This number may seem excessive, but most of the examinations need involve no more than measurement of uterine height and girth, auscultation of fœtal heart, tests of urine, and inquiries as to general health, and can be conducted by the midwife. At the thirty-second and thirty-sixth week the medical officer should endeavour to ascertain the presentation of the fœtus and the relation of head to pelvis.

The disadvantages of any system under which the doctor who examines a woman during pregnancy does not conduct her labour are obvious. But antenatal centres staffed by medical officers, to which practising midwives are welcomed with their patients, are a compromise which succeeds in providing for medical supervision in cases deemed to be normal, and for the diagnosis of abnormal ones, who are referred to the doctor concerned. In the present transitional stage of our maternity services it is not easy to suggest a

[1] Deutsch. Med. Woch., July 21st, 1929, p. 1164.

[2] Maternal Mortality in Childbirth. Antenatal Clinics: their Conduct and Scope. Mem. 145/M.C.W. 1929, H.M. Stationery Office.

better antenatal scheme than the one which would be available if all the welfare centres were raised to the standard indicated in this memorandum.

ANIMAL EXPERIMENTS.

BY a coincidence, the annual return[1] from the Home Office relating to experiments on living animals is issued this week, when the general arguments justifying vivisection are set out so eloquently in our columns by Prof. A. V. Hill. We need do no more than summarise the details of the return.

The names of 1310 persons who held licences for experiments on living animals during any part of the year 1928, and of the 256 registered places where such experiments can legally be performed, are set out. The number of experiments performed was 315,891, and these are classified according to their nature. Some 15,000 were performed under anæsthesia; this group includes all operations more severe than subcutaneous venesection. The rest, amounting to over 300,000, were mainly inoculations, but feeding experiments, the administration of substances by the mouth, by inhalation, or by external application, and the abstraction of blood by puncture or simple venesection, also come into this category.

It is often wrongly assumed that most of the operations are done in the hope of directly acquiring new knowledge; the truth is that the large majority are not experiments in this sense, but are biological tests necessary for the production or standardisation of drugs, serums or vaccines, or inoculations to confirm diagnosis. One licensee did over 69,000 experiments jointly with others, for the purpose of standardising drugs, and nearly all those who record large numbers of experiments performed under certificate A alone (that is, without anæsthetics, on animals other than dogs or cats, horses, asses or mules) were working for public health authorities, or in connexion with standardisation. The only reason for emphasising this distinction in purpose is to show how rigid is the supervision over even the most trivial routine animal inoculations, and how strict are the rules governing the issue of licenses. Registered places are constantly being visited by inspectors, mostly without previous notice, and the animals have been found suitably lodged and well cared for. The three irregularities reported during the year were obviously inadvertent and unimportant.

THE National Radium Trust have appointed Mr. P. Barter, of the Ministry of Health, Whitehall, to be Secretary of the Trust, and Mr. Niven F. McNicoll, of the Department of Health for Scotland, to be Assistant Secretary.

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[1] H.M. Stationery Office, 1929, pp. 68, 1*s.* 3*d.*

PURE RIVERS SOCIETY.—At a recent meeting of this society, whose address is 1, Lincoln's Inn-fields, London, W.C.2, resolutions were forwarded to the heads of Government Departments concerned with rivers pollution. The Minister of Transport is urged to make it a condition of grants to local authorities for road-making that they shall not use on roads any poisonous substance which may affect rivers. The Minister of Agriculture and Fisheries is invited to arrange that subsidies to beet-sugar or other industries should only be granted on condition that adequate provision is made against pollution. The Minister of Health is asked to obtain power to set up River Boards on his own initiative without, as at present, having to wait for applications by the local authorities. It is also urged that a central authority on the lines of the Railway Commissioners should be set up to deal with river pollution, and a resolution asking for an amendment of the law relating to prosecutions for pollution has been sent to the Prime Minister.

The Clinical Interpretation of Aids to Diagnosis.

A Series of Special Articles contributed by Invitation.

XXXIX.

THE DICK AND SCHULTZ-CHARLTON TESTS.

THE Dick test closely resembles the Schick[1] test. People who are susceptible to scarlet fever and have no scarlet fever antitoxin in the blood, show a red flush on the forearm when 0·2 c.cm. of an appropriate dilution (about 1 in 1000 to 2000) of scarlet fever toxin is injected intracutaneously. This toxin is the filtrate of a broth culture of the streptococcus associated with scarlet fever. By the injection of about 5 c.cm. of a good concentrated scarlet fever serum, immediate protection, lasting from two to three weeks, can be conferred on such people or they may be given prolonged immunity by active immunisation with three or four graded doses of the toxin. The same general conclusions apply *mutatis mutandis*, as in the Schick test, though the concordance between a negative reaction and degree of immunity is less close. Thus, whereas practically all patients suffering from diphtheria are Schick positive, from 5 per cent. to 20 per cent. of those with scarlet fever when first seen may be negative to the Dick test. It is possible that the average Dick-negative patient does not possess quite as high an immunity to scarlet fever as the Schick-negative reactor does to diphtheria.

Reading of Results.

The reading is usually made overnight, though a positive reaction in some patients may be easily read as early as four to eight hours after the injection. The red flush usually fades 48 to 72 hours later. When the control toxin has been sufficiently heated "pseudo" reactions are so rare that "control" injections, after a little experience of their use in a given group of people, may often be dispensed with.

Treatment and the Test.

The Dick test may help in deciding on the treatment and disposal of a patient with a rash possibly due to scarlet fever. A positive Dick reaction will be consistent with the diagnosis of scarlet fever; unfortunately, a negative response will not exclude scarlet fever, for in a given series of patients with scarlet fever perhaps 1 in 10 might be Dick negative. It is curious that the swab and direct smear from patients with rash is not more widely employed in diagnosis. The smear from the typical scarlet fever patient shows numerous diplococci or short chains of cocci. Swabs in almost every instance yield large numbers of colonies of hæmolytic streptococci on a blood plate after overnight growth in the incubator; the zone of hæmolysis is easily seen with the naked eye. From patients with rashes due to measles, rubella, drugs, or enemata, this blood plate with almost pure culture of hæmolytic streptococci is rarely obtained, though a close examination may yield a few colonies in perhaps 5 to 20 per cent. of the patients tested, as in any sample of the general population. The examination of swabs from convalescent patients has already been discussed in this series by Dr. J. G. MacCartney (THE LANCET, 1928, ii., 565). Several writers have recently brought forward some evidence suggesting that the convalescent whose swab still yielded hæmolytic streptococci on discharge was more apt to cause "return cases" of scarlet fever than the convalescent with a negative swab, and in Germany the necessity of a negative swab before discharge has been officially discussed. Since at present probably

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The Schick test was discussed in this series last week.

from one-third to one-half of the convalescents discharged after scarlet fever still have hæmolytic streptococci in throat or nose, a new addition to the perplexities of the medical officer of health appears to be threatened.

Contacts.

The tests aids us in dealing with those who have been or are exposed to the risk of infection. Though some authors have reported instances of scarlet fever in people who have given a negative Dick reaction, these are rare. Fifty patients under Dr. Sage Sutherland's care in Manchester became exposed to infection; of 37 negative reactors, none suffered from scarlet fever, while of 13 positive reactors, six became infected. Of 168 Dick-positive reactors under Dr. W. T. Benson's observation in Edinburgh, 36 contracted scarlet fever, while of 97 negative reactors none was atacked. Nursing staffs naturally Dick-negative, or made negative by immunisation, in Edinburgh, Birmingham, Aberdeen, Cardiff, and other large isolation hospitals, remain free from the disease. It is thus reasonable to act on the assumption that a contact who is negative to the test, either naturally, after active immunisation, or after receiving a prophylactic dose of antitoxin, will not develop the disease (though in the last instance the protection is but temporary). A dose of 5 c.cm. is successful when used as a routine in hospitals to control ward outbreaks; in this way the necessity for closure of wards is reduced or wholly avoided.

The Schultz-Charlton Test.

If the serum of a patient convalescent after scarlet fever (which contains the specific antitoxin), or the serum of an immunised horse, be injected intradermally into an area of skin showing an early scarlet fever rash, a blanching of the rash an inch or more wide will be found next day, perhaps persisting until the rash fades. This result is apparently completely specific; a rash which shows the blanching must be due to a scarlet fever streptococcus. Unfortunately, it is in testing characteristic vivid rashes (where no confirmatory test is called for) that the blanching is most definite, while in some atypical rashes in scarlet fever the blanching may not occur, nor does it appear if the scarlet fever rash be more than three days old.

Active Immunisation.

When active immunisation is contemplated the Dick test may be used to find those susceptible to scarlet fever, though children are to-day injected by some authorities without preliminary testing. There is no reason why the Schick and Dick test—and the later immunisation where needed—should not be done simultaneously; the Dick control injection may be omitted without much risk of error.

Reservations.

The test has been used on a large scale in clinical work and its utility clearly demonstrated, but there are a number of points and exceptions to the usual rules not at present understood. Thus, a few patients on admission with undoubted scarlet fever are negative to the ordinary Dick test; a number of patients on recovery, even though untreated with serum, remain positive to the test; the young baby, even though born of a Dick-positive mother, is often negative to the test and may be left to suckle from a mother suffering from scarlet fever without risk that it will develop the disease; adult rabbits will die from intravenous injection of scarlet fever culture or toxin while young rabbits may escape. These discrepancies are not met with in connexion with the Schick test. One suggested explanation, put forward mostly by American and German workers, is that the Dick-positive response represents an "allergy," a sensitiveness to the protein or other constituent of the scarlet fever streptococcus. For a full discussion of these conceptions (which at present concern the research worker more than the practising physician) the original papers must be consulted. It is possible that the truth lies halfway and that as in the tuberculin reaction, both a specific toxin and a specific sensitising body, protein or carbohydrate, play a part.

Summary.

The typical patient suffering from scarlet fever is positive to the Dick and Schultz-Charlton tests, and a blood-agar plate shows almost pure culture of hæmolytic streptococci. These three tests, used with a recognition of their limitations, are of aid in the diagnosis and prevention of scarlet fever.

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Special Articles.

THE CHROMOSOME IMBALANCE THEORY OF CARCINOGENESIS.

BY J. A. MURRAY, M.D., B.SC. EDIN., F.R.S.,
DIRECTOR OF THE IMPERIAL CANCER RESEARCH FUND.

Boveri's essay, "Zur Frage der Entstehung maligner Tumoren," was published in 1914. The stern preoccupation of the war and Boveri's death prevented any widespread discussion of his views. Recently both in Germany and in America renewed interest has been evinced in the theory he propounded and an admirable and faithful translation into English has been made by Mrs. Boveri.[1] Prof. M. N. Metcalf, who provides a sympathetic introduction to the translation, has, in another place, deplored that as the only pupil of Boveri engaged in cancer research, I have not explored the possibilities opened up by Boveri's theory. This fact, and the intrinsic interest of the theory, lead me to take this opportunity to give a summary of it and the reasons for my own attitude.

The Theory Summarised.

The theory may be summarised as follows. The cancer problem is a cell problem. The cancer cell is essentially a defective cell, and the defect is in the nature of an inherent permanent change imposed on it and all its progeny, at the time it arises from a previously non-cancerous ordinary cell of the body. One of the most clearly demonstrated ways in which a permanent transmissible defect can be produced in a cell is by the elimination of a chromosome or chromosomes from the nucleus, as occurs in multipolar mitotic division. As chromosomes each divide into two in mitosis, it is clear that the presence of more than two centrosomes in the mitotic figure must lead to an unequal distribution of the daughter chromosomes to the resulting daughter cells. Boveri's analysis of the consequences of a primary multipolar division of the disperm fertilised sea-urchin egg showed that the larvæ which develop are pathological when all the chromosomes take part in a single distorted equatorial plate surrounded by four attraction systems (tetraster). The four quadrants of the resulting blastula are pathological to different degrees and in different ways. Two of these pathological pictures are extraordinarily suggestive and impressive. In one, the cells leave the blastula wall and migrate into the blastula cavity, forming an irregular heap of rounded or polygonal cells. In the other the cells separate from each other and from the remainder of the blastula, and float away as free elements in the surrounding sea water. One seems to have in diagrammatic simplified form loss of differentiation, the breaking up of physiological union, and metastasis formation. This observation undoubtedly was the germ of the theory in Boveri's

[1] The Origin of Malignant Tumours. By Theodor Boveri. Translated by Marcella Boveri. London: Baillière, Tindall and Cox. 1929. Pp. 119. 11s. 6d.

mind. In the first instance, and in its simplest form, the cancer cell arises singly as one of the products of multipolar mitosis, in which the fortuitous distribution of the half-chromosomes has resulted in a nucleus, capable of continued existence, but defective in chromosome-individuals necessary for the ordered growth and metabolism of the normal cells.

Certain Objections.

When Boveri came to write up this idea in the form of a connected theory many further observations and analogies were drawn upon, and the discussion of objections, to which a separate chapter is devoted, is a fascinating example of subtlety, erudition, and scientific humility. He at once realised that the uniformity of the tumours which arise when the stroma of a transplantable mouse carcinoma undergoes sarcomatous transformation and, still more, the uniformity of the filterable tumours of the fowl, were fatal to the hypothesis which, in its original simple form, depended on the fortuitous result of multipolar mitosis. To meet this difficulty it was assumed that cell-poisons acting specifically on single chromosomes, inhibiting or enhancing their action, might intervene in the process. The analogy of certain hybridisation experiments with sea-urchin eggs was cited in support of this assumption. Baltzer, in fact, had shown that in some crosses only a few of the male chromosomes entered the fertilisation spindle and took part in the formation of the embryonic nuclei. The others remained inert and were handed on passively to one or other daughter cell till they degenerated. The theory of chromosome imbalance thus acquired a considerable increase of strength having, like the incalculable Kai Lung, a tale to fit any possible concatenation of circumstances.

Conclusion.

It is idle to speculate how the intensely practical experimental mind of Boveri would have reacted to the great acquisition of knowledge of carcinogenesis in the last ten or twelve years. A theory or hypothesis which could not lead to the planning of decisive experiments had little permanent appeal for him, and he candidly reports the complete unsuccess of the large number of experiments he himself carried out to test his views. On sending me a copy of the original paper in 1914 he wrote: "I expect you will smile at it, but one must do what one can." In spite of the most serious consideration of the theory, and an affectionate admiration for the author, I have never been able to acquiesce in the fundamental conceptions of cancer which underlie it. Loss of differentiation, loss of physiological control, are the negative side of the cancer cell. Its independence and greater adaptability to external conditions seem to me rather to indicate an acquisition of new properties, not defects. The recent attempt of Bauer still further to fortify the hypothesis by substituting destruction or inhibition (or conversely over-activation) of single genes only has the effect of withdrawing still further the theory from experimental proof or disproof and thereby lessening its utility. It is now many years since I relinquished the attempt, after laborious trials, to find constant significant alterations in chromosome numbers, nuclear size, or nucleus-protoplasm ratio in cancer cells. The facts, so far as they went, did not harmonise with Boveri's theory. The subsequent modifications, while they may diminish the weight of this negative evidence, do not furnish compensating advantages in devising more conclusive tests of its validity.

A REDCAR HOSPITAL.—The Yorkshire borough of Redcar, which has a population estimated at 22,000, and receives many thousands of visitors every year, has hitherto been without a hospital. The need has now been supplied by the presentation to the town by Mr. Arnold Stead of his residence, Everdon, as a memorial to his father. The building, which has been adapted to hospital purposes, contains seven beds, and has been fitted with apparatus for sunlight treatment, was last week opened by the Dowager Marchioness of Zetland.

SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

Edinburgh University: Address to Graduates in Medicine.

THE Professor of Bacteriology, Dr. T. J. Mackie, was charged with the duty of addressing new graduates in medicine of Edinburgh University last month. He reviewed the present system of medical education, which needed drastic revision. The outstanding faults of the educational system now in force were the products of its growth and evolution. Medicine was once entirely art; it was now mainly science, and was one of the great divisions of biology. The medical worker might well be the supreme biologist, and it was all-important that at the very threshold of university study there should be a rational introduction to general biology—not botany, zoology, or anatomy as such, but the science of life in its broadest aspects—leading up to the more specialised study of the biology of the human species, with whose vital problems the doctor had to grapple throughout his career. The physical sciences lay at the very foundation of biology and medicine. Some medical schools had attempted to relieve the pressure of their curricula by separating off such basic studies in the first of a six years' course, leaving five years for purely medical subjects. The addition of a year to the curriculum seemed at first sight the obvious solution of a difficult educational problem, but it might still be possible to maintain the original quinquennium by a closer coördination of these preliminary studies, one with another, and with that of anatomy and physiology during the first and second years. The latter subjects constituted an integral part of the fundamental biological training and with biology, physics, and chemistry, made up the complete basic structure of their educational edifice. From the study of normal biological phenomena, the student turned to the abnormalities, accidents, and infirmities from which humanity sought protection and relief. From biology as a pure science he passed to the applied biology of practical medicine. The question arose whether the existing system of examinations in subjects might be replaced by yearly examinations, corresponding to annual units of instruction. As to the clinical part of the curriculum, it was sometimes claimed that the scientific attitude was incompatible with practical work as a doctor, and that the so-called medical art should be inculcated by bedside training according to thoroughly practical tenets, leaving scientific medicine as a thing apart in the research laboratories. If medical training were stripped of its scientific instruction, however, it would hardly justify a University degree, and would be degraded back to a mere apprenticeship. The practice of medicine was becoming more and more of an applied science, and necessitated a training in fundamental principles. The practitioner was constantly confronted with problems that were only to be elucidated by scientific method. It must also be remembered that scientific applications and laboratory methods had in modern times proved their value in medicine to such an extent that the hospital ward was no longer the centre of gravity of medical enterprise. The laboratories were serving humanity in the cure and especially in the prevention of physical suffering, as much as were the clinics. Lastly, a medical education would serve our civilisation poorly if it did not kindle fires of research among those pupils of originality and initiative who were responsive to the inspiration of scientific teaching. Our present system of training did not provide sufficient opportunities for those who might wish a more complete science training. On the analogy of the honours degrees in other faculties there might be instituted an Honours Degree in Medicine, connoting special and advanced study of one or more branches of medical science in addition to the general curriculum.

Bi-Centenary of the Edinburgh Royal Infirmary.

Arrangements for the celebration of the bi-centenary of Edinburgh Royal Infirmary have now provisionally taken shape. The anniversary of the opening of the institution fell on August 6th, and as that is the time of the year when holidays take a great many away from the city, it has been decided to defer the public part of the celebration till early in October. August 6th, however, did not go unmarked; on that day, an illustrated commemorative card was distributed to every patient and every member of the staff in the infirmary. The proposal for October is that the bi-centenary should be the subject of a thanksgiving service in St. Giles Cathedral, and, later in the same day, of a public meeting, when an appeal will be launched for the extension scheme on the site of George Watson's College. The intention is to provide a maternity and gynæcological hospital for the accommodation of 240 patients at a cost of £300,000; certain notable donations have been already made to this end.

The late Mr. A. G. Miller.

The death occurred in Edinburgh on Monday, July 29th, of Mr. Alexander Gordon Miller, consulting surgeon to the Royal Infirmary, Edinburgh, in the eighty-seventh year of his age.

Mr. A. G. Miller was the son of Prof. James Miller, formerly professor of surgery in the University of Edinburgh, and was educated at Edinburgh Academy and the University, graduating in medicine in 1864. He held house appointments in the Infirmary, took the Fellowship of the Edinburgh College of Surgeons, and in 1877 became assistant surgeon to the institution. Five years later he was appointed full surgeon in the new Royal Infirmary which had just been built. It will be seen by the dates that when he received his staff appointment the question of antiseptic surgery and the value of the Listerian system was still acute, when he, with most of his younger contemporaries, recognised the value of the new work, while the seniors on the staff were unable to reconcile themselves to the revolutionary theories. But it must be remembered that many of those seniors were not, strictly speaking, consulting surgeons, but rather could be described as successful general practitioners, who carried on surgical work if and when required. Miller displayed in his surgical work considerable originality, being the deviser of a method for excising the knee, a method for reducing dislocation of the shoulder, and a new technique for disarticulation at the knee-joint. The general level of his teaching in the wards secured his appointment as lecturer on surgery and as an examiner in that subject at the University, and also at the Scottish Royal Colleges. Although he had outlived most of his colleagues, there are still students who remember the interest which he took in their careers, his enthusiasm as a volunteer, and his strong advocacy of the temperance cause. He was, and for good cause, very highly respected.

Dr. Thomas W. M. Cameron, M.R.C.V.S., of the London School of Hygiene and Tropical Medicine, has been appointed lecturer in Helminthology in the Department of Zoology of the University of Edinburgh, and the Royal (Dick) Veterinary College.

UNITED STATES OF AMERICA.

(FROM AN OCCASIONAL CORRESPONDENT.)

Rural Medical Service.

THE results of a study of 860 replies to a questionire on the availability, quality, and cost of medical ervice in rural districts throughout the United States published in a recent issue of *The Farmer's Wife*. It is found that the average distance of the farmer from the nearest doctor is just over seven miles; the average time required for the doctor to reach the patient is, in summer, half an hour, and in winter, 56 minutes. Nearly one half of the farmers, however, are not satisfied to patronise the nearest doctor for all troubles, though nearly 90 per cent. will do so for minor ills. Where the choice of medical attendant is exercised, the average distance travelled by the doctor leaps from 7 miles to 19. Specialists are even more remote; 15 per cent. of the farms, for example, have no nose and throat specialist within a radius of 50 miles. The average distance to hospital is 18 miles, and the time needed to reach it 49 minutes in summer and 97 minutes in winter. There is some evidence that the modern public health campaign has penetrated even to remote districts. Two-thirds of the school-children have health inspection at least once a year, though only in about half of these inspections does a physician take any part. A nurse is usually present and active. In the event of sickness in the home, according to over 80 per cent. of the replies, a nurse is available within 12 hours. During the year the "average" farmer spends 105 dollars (about £21) on expense due to sickness. Of this, rather less than half goes in doctor's bills. The average fee charged for a home call was $7.63, for an "office" visit $1.59. It is interesting to learn that 95 per cent. of the homes had summoned a doctor for the birth of the last baby. The average fee for a confinement case is $28.33.

The Prevalence of Undulant Fever.

At a recent meeting of the Georgia State Medical Association Dr. E. A. Banker, jun., drew attention to the increasing importance of undulant fever in this country, and recommended that it should be made a reportable disease in all States. From the State of New York is reported the ironic fate of a health officer who declined to use pasteurised milk, favouring instead a small and well-supervised dairy, which gave milk unusually rich in cream. He fell victim to a continuous fever, and the State department, aiding in the diagnosis, was able to isolate *B. abortus* both from the patient's blood and from the blood and milk of one of the cows. At the same meeting Dr. T. E. Oertel, of Augusta, pointed out that serpents are still plentiful in the South-Eastern States, but that very few of them are poisonous. The great majority are not only highly ornamental but are useful to the farmer by feeding on vermin, and should be protected. The water snakes, however, should be destroyed for the protection of fish. By far the most important of the venomous snakes is the rattle-snake, which is easily recognised. There are also two species of coral snakes in the United States, only one of which is found in the East. During the year 1928 31 cases of snake-bites from poisonous serpents were reported in Georgia.

Possible Danger of Artificial Refrigerators.

The rapidly increasing use, partly no doubt the result of concentrated advertising, of artificial refrigerators in place of the once universal ice-box, lends a special interest to a coroner's inquest held at the beginning of this month in Chicago. The coroner's jury was composed of a group of distinguished scientists, including Prof. Hayhurst, of Ohio State University, and three professors from the University of Chicago. The coroner's chemist gave evidence that death was due to methyl chloride poisoning, and that guinea-pigs placed in the deceased's flat had also died from the same cause. A definite leak had been found in the refrigerator, and the air of the flat was found to be heavily contaminated with methyl chloride gas. The jury found that the cause of death was inhalation of this gas, and recommended that steps be taken to prevent further sickness and death from such causes. The city health officer and other physicians believe that there have been other cases of sickness and death from this cause in recent months.

Public Health Services.

PORT OF LIVERPOOL.

IN his report for 1928 to the Liverpool Port Sanitary Authority Dr. A. A. Mussen mentions 5110 visits of inspection paid to ships, of which 933 (948 last year) had nuisances on board; there were 3131 (3297) dirty forecastles, and 363 (409) foul w.c.'s. He explains that it is when men are leaving ships they permit their forecastles to become nuisances. Complaints are rare when crews are still attached to the ships, and this may be why dirty forecastles are less often noted on foreign ships, for only British ships discharge their crews at Liverpool.

Of 39 cases of enteric fever mentioned as occurring during voyages that brought ships to Liverpool, 23 were among the crews; the same was true of 28 of the 52 varicella cases. Sixty cases of tubercle were landed, their origin being unstated. No cases of cholera, plague, or yellow fever were brought ashore, but 12 rats were found to be infected with plague, none of which, however, was caught ashore. In 1928 plague was prevalent in Aden, Lagos, Rangoon, and Bombay: cholera in Calcutta and Shanghai; and yellow fever in South America and West Africa. Of anthrax, 8 cases appeared in or near Liverpool and one died.

On ships 29,189 (31,357) rats were found, and in the port 2250 (2382)—a decrease in spite of increased activity in the search. The city yielded 16,664 (17,671). This is the third year in which the total found in Liverpool has decreased, the figures being 55,012 in 1926, 51,410 in 1927, and 48,103 in 1928. Rats are decreasing on Liverpool ships, probably because the ships are being better rat-proofed. On 45 "rat-proofed" ships fumigation killed 3·1 rats per ship; on 68 ships, not rat-proofed, fumigation killed 25·5 per ship. On 16 ships of two unnamed companies which rat-proof their ships and keenly trap rats, no rats were found at all; 31 ships of other companies averaged 14 rats per ship. Rats are to be reduced, Dr. Mussen thinks, by careful supervision when loading abroad, by rat-proofing to prevent them from straying round the ship in search of water or nesting places, by trapping, and by periodic fumigation. Cats on board ship are too well fed to be any safeguard. Since October all foreign-going ships of the world have been examined for rats; if found free they get a deratisation exemption certificate, valid for six months; if rats are found fumigation is done and a deratisation certificate, also valid for six months, is issued under the sanction of the International Sanitary Convention. This Convention, signed at Paris in 1926, is set out at length in the valuable Appendix to the report.

The Seamen's Dispensary dealt with 2043 (1843) cases of venereal disease. In every 100 cases there were 33·5 of syphilis (a quarter of them not yet Wassermann-positive), 4·5 of soft chancre, and 62 of gonorrhœa. These are cases, not first infections. Of 101,725 male attendances in all the Liverpool treatment centres, 1579 were for soft chancre; but of 15,265 female attendances, only 4. Of 20,688 aliens who arrived at the port 9 were certified—5 for mental deficiency, 2 for venereal disease, 1 for hyperthyroidism, and 1 for epilepsy. Of 116,083 emigrants, 16 were rejected for infectious diseases. The arrangements for food inspection are given in detail; the amount condemned and supervised was 1967 (2621) tons; in this section of the report is an interesting discussion of the methods of preparation of currants in Greece. The Port Sanitary Authority gives certificates of disinfection before the export of rags, &c., and of the wholesomeness and cleanliness of preparation of exported foods.

This year's report contains much useful information, and the general provisions of the International Convention set out in the Appendix make it clear how greatly the confidence of the world in the work of the Port Sanitary Authorities of the other nations—formerly discussed with so much suspicion—has increased in the last 30 years.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

THE following are some 1928 statistics of two large east coast seaport cities:—

Name of city and estimated (R.-G.) population.	Birth-rate.	Death-rates per 1000 of the population.					Death-rates per 1000 births.		
		All causes.	Tuberculosis.	Cancer.	Respiratory diseases with influenza.	Heart disease.	Infant and neonatal mortality.	Young child (1–5 yr. mortality.	Maternal mortality from childbirth.
Edinburgh .. (428,454)	17·3	13·7	1·05	1·60	2·2	2·1	75/30	39	7·8*
Hull .. (297,600)	20·5	12·8	1·21	1·44	2·2	2·3	79/30	30	4·1*

* These figures are not strictly comparable owing to the different methods of classification adopted by the English and Scottish Registrars-General. The figures for puerperal sepsis alone are Edinburgh 2·7, Hull 2·1; and the Hull figure for childbirth becomes 4·6 if three deaths associated with pregnancy and child-bearing be included.

Edinburgh.

Dr. W. Robertson describes a death-rate of 13·7 as a satisfactory figure, but points out that the congested areas sully the vital statistics. Thus the death-rates for St. Giles, St. Leonards, St. Andrews and North Leith wards were 18·5, 16·2, 15·7 and 17·2 respectively. The infant mortality-rate is the lowest ever recorded for the city. The scheme for providing cookery lessons for the mothers, with elementary appliances, such as are available in the poorest homes, has proved a great success. Illustrations are given of the lessons in progress, and of safe playgrounds for the children while the mothers are so engaged. A great point is made of using simple and often neglected valuable foods. One aim of the cookery lessons is to stimulate the housewives to desire a house in which the meals can be prepared with far greater ease. The various housing schemes have already demonstrated their value in the improved health of the children, and it is further hoped that the almost magical effect of a sojourn in a convalescent or holiday home on slum children should result in much more accommodation of this kind being provided. Recently four improvement schemes have been initiated involving nearly 2000 houses. Further progress depends upon the rate of building. Reconditioning is not likely to be of much service in the congested areas of large Scottish towns, in which the old-type of tenement with its long dark passages, gloomy ill-ventilated lobbies and centrally placed stairways prevails. The architect finds that it is cheaper to build new houses than to gut and recondition such old properties. Reconditioning, if it can be done cheaply, may occasionally be of some service for old couples, single persons and childless folk. For growing children the out-lying areas are the places for housing schemes. The worst statistics are recorded in those wards where one and two-roomed houses are most numerous. Thus St. Giles has 1142 single-roomed dwellings and 694 of two rooms, whilst St. Leonard's ward has 1206 single-roomed and 2484 two-roomed houses. Many citizens have gladly seized the chance to change over into well-equipped municipal houses. The slum-dweller must now have his turn, says Dr. Robertson, and those who can afford to pay economic rents should not look to corporations to provide houses for them, but get into touch with building societies, &c. Schemes for providing well

nducted hostels for men and women are taking finite shape.

Turning to infectious diseases, Dr. Robertson ints out that ecomomies have been effected by eating more of the scarlet fever cases in their mes. Immunisation against diphtheria among hool children can only proceed slowly with the resent staff. The hospital experience during the ear showed that immunisation by toxoid-antitoxin jections did not ensure absolute protection among ne nurses. There were two cases of diphtheria in urses, who had apparently been successfully mmunised, but in each case the attack was mild nd recovery rapid. On the other hand, there were o cases of scarlet fever among the immunised ursing staff. Dr. David Lees, the V.D. medical fficer, brings out several interesting points. A much rger number of patients now come to the clinics o have their condition investigated, who, after earching tests, show no evidence of venereal infection. hus the non-venereal cases attending the clinic ave increased year by year from 727 in 1924 to 362 in 1928. Repeated examinations are necessary o discover evidence of the gonococcal infection in phthalmia cases, if a silver preparation has been sed before attendance at the clinic. Vulvo-vaginitis n children, usually the result of sleeping with infected arents, requires long periods of hospitalisation or its cure. In-patient treatment is much more aluable in female infections and increased bed ccommodation, especially for married women, is n urgent necessity. Intensive in-patient treatment or a few weeks often saves much time and suffering. he number of defaulters, who discontinued treatment efore being cured was 863 and the report of the urses, who follow up these defaulters and endeavour o get them to resume attendance, shows how hopeless his work frequently is, and justifies the proposals or some form of compulsion.

The death-rate from pulmonary tuberculosis was he lowest ever recorded and there is a satisfactory ecline in non-pulmonary tuberculosis. During the ear 16 patients were admitted to the Polton Farm olony and 11 discharged. The expenses for the pkeep of the colony amounted to £3097, and the eceipts from the sale of pigs, poultry, eggs and other roduce were £1557—a net expenditure of £1540.

The testing of the Victoria Hospital tubercle-free erd revealed only one reactor, which had a small sion in the mediastinal glands. The municipal arm has been reconditioned and during the spring nd summer a herd of about 80 tubercle-free cattle as purchased, amongst which at the November testing these was one doubtful reactor. All the unicipal hospitals are now supplied with milk om this farm. The city cow population is 3421, nd amongst these 43 tuberculous cows were found uring the year and eliminated from the herds. he incidence of tuberculosis in the city and district s revealed by post-mortem statistics at the abattoirs, ays Mr. A. Gofton, the chief veterinary inspector, hows no material change as compared with former ears. Of 119 bulk samples of country milk 6 or 5 per ent. were found to be tuberculous—a smaller per-entage than the average of recent years. Of the 87 samples of milk taken under the Sale and Food nd Drugs Acts the city analyst reported 42 as dulterated. The average milk fat of all these statutory amples was only 3·48 per cent., which may be ompared with the average composition of similar atutory samples, also including the adulterated amples, in the report of the Lancashire public nalyst for 1927. It is there shown (p. 7) that the ggregate samples, numbering 87,981, taken in ight districts in the North of England over a period of ears the average fat was 3·64 per cent., whilst the west average among the eight districts (Liverpool) ave an average of 3·60 per cent. One dealer in dinburgh with two previous convictions against im was fined £35 for selling milk 36 per cent. deficient n fat and containing 38 per cent. of added water. here is said to be room for more antenatal work in Edinburgh, especially in the outlying parts of the city. Dr. T. Y. Finlay (M. & C.W.M.O.) points out that this work should be in close association with a maternity hospital and that, to be really effective, it should be in the charge of obstetric specialists, or expert doctors, who are in daily contact with midwifery practice. The fact that the health visitor is seldom in direct touch with the antenatal clinic also detracts greatly from the real usefulness of her visit.

The chief sanitary inspector, Mr. A. W. Ritchie, draws attention to the failure of householders to see that their water cisterns are cleaned every six months. This raises the point that no householder ought to use Edinburgh's excellent water for drinking purposes after it has passed through a cistern, even if it is cleaned out every day and that each house should be supplied with at least one tap direct from the main for drinking and culinary purposes. Liverpool have special powers to enforce this.

Hull.

Dr. W. Allen Daley (whose appointment as divisional medical officer to the London County Council has recently been announced) reports that the year has been a busy one, in planning for the unification of the medical services of Kingston-upon-Hull, and preparing for important developments with respect to the establishment of the new isolation hospital, the extension of the city's boundaries, and the taking over of the medical work now done by the Guardians. The interavailability of the clinics has worked successfully. Thus there were 11,315 attendances of pre-school children and expectant and nursing mothers at the Education Committee's clinics, and 733 of school children, and 1096 of tuberculosis cases at the M. & C.W. light clinic. The East Hull clinic is to be erected on the site adjoining the East Tuberculosis Dispensary and will provide for East Hull all clinics and treatment supplied by the M. & C.W. and school medical departments. The various authorities have also adopted a scheme for the inter-change of their medical staff. Thus medical officers can be taken from routine work and turned on to emergency work. Again, during holidays, school medical officers can be given work in other departments. Assistance when needed will be furnished to the port medical officer, who on his side, will take part in administrative work. The new scheme, in fact, provides for the same doctors to work in the M. & C.W., school medical, tuberculosis, and other departments, and this will not only be good for the patients, but will save the officers from getting into watertight compartments and from having a limited outlook. Four of the senior staff will be primarily each in change of a department. while available for work in other departments These four seniors meet the medical officer of health once a month to discuss administrative matters, whilst evening meetings are held from time to time of the whole of the medical staff, numbering 25, for the reading of papers, discussions, &c. The new isolation hospital has made progress. The first four pavilions are completed and it will probably be opened about August, 1929, after which the existing hospital will be adapted for use as a maternity home and infants' hospital to accommodate 81 patients It is intended to make this new maternity home a model of efficiency. At the end of the year the privy conversion scheme was nearly completed, 38,650 out of 40,650 conversions having been completed and 614 unnecessary privies and pail-closets removed. The 1380 remaining privies and pail-closets are mostly in property which has to be demolished or in unsewered areas.

The municipal houses erected numbered 1008 in the suburbs and 12 tenements in the New George-street area, where further demolitions have been effected and another block of eight tenements and four lock-up shops is being erected. Two further improvement schemes will shortly be undertaken. Central heating on the Cookanheat system has been

installed in 2650 municipal houses. There is considerable prejudice against central heating among those, who are accustomed to coal fires. Complaints have been received that when sufficient heat is raised to warm the bedrooms, the living rooms become unbearably stuffy. A plebiscite among the tenants showed 30 per cent. for and 70 per cent. against central heating, but some of them have changed their minds as the result of six months' trial of the installation. The corporation now contemplate building houses with sash windows, instead of casement, as being more easily openable in bad weather, and they are also constructing open fire-places with the fire in one room and the oven in another. In order to remove grounds for complaint in the centrally heated houses, ventilators are to be fitted in the living rooms. In some cases the tenants have neutralised one of the advantages of the Cookanheat system by using coal instead of a smokeless fuel The municipal building programme is being extended and probably 1500 houses and flats will be erected in 1929. In all present or future schemes bricks are being used in preference to concrete or other patent forms of construction. On the East Hull estate there were 40 parlour houses to let at the end of the year, but there is still a demand for parlour houses in North and West Hull and a vigorous demand for the smaller type of corporation house at all-in weekly rentals of 12*s.* 2*d.* and 13*s.* 6*d.* for two and three-bedroomed houses respectively. Dr. Daley points out, however, that the housing problem is not solved until houses have been erected at rentals which can be paid by families of five or six with incomes from £2 to £3 per week.

The Hull medical committee on cancer, at the suggestion of the Ministry of Health, is to investigate cancer of the breast, uterus and rectum. Lectures on the early diagnosis and treatment of cancer are given to medical men and women, and the committee are taking steps to secure an increased amount of radium for the treatment of cancer in the city. Hull like Edinburgh, recorded its lowest infantile mortality figure in 1928, and this in spite of a hot summer and an increase in the diarrhœa deaths. The hours of bright sunshine were 1339 in 1928, 1118 in 1927 and 1299 in 1926. Dr. Daley compares the diarrhœa deaths in 1928 with the hot summer of 1911, when infant welfare work was in an undeveloped condition. In 1928 there were 64 diarrhœa deaths under 1 year, 8 between 1 and 2 years, 2 between 2 and 5 years and 8 over 5, whereas in 1911 there were 423 under 1 year, 105 between 1 and 2, 26 between 2 and 5 and 54 at ages over 5. There was an outbreak of small-pox during the summer, which lasted until November and gave rise to 65 known cases. The outbreak began with a family which contracted the infection in a town in the West Riding. They had stayed during Whitsuntide in a house where there was supposed to be chicken-pox. The disease was very mild in character and there were no deaths. In most of the cases the onset was characterised by headache, dizziness and a feeling of "swimminess," associated with vomiting; backache was not a common feature, and in only four cases was sore-throat complained of. Dr. Daley gives full details and shows how the spread of infection was apparently helped by continuous desks in the schools. The infectivity of the disease was not nearly so great as that of small-pox of a generation ago. As the first cases had about four weeks' start of the intelligence department, the task of searching out new cases in order to restrict the outbreak was one of great magnitude. It is hoped to develop an anti-rheumatic centre in connexion with the medicinal baths. Dr. Daley points out that insured persons in Hull consumed 22 per cent. more medicine than the average for the area.

The reductase test has proved satisfactory as a preliminary bacteriological test for milk. Of 82 samples of "outside" milk examined for tubercle, eight or ten per cent. gave a positive result. In following up the eight positive cases, tuberculous cows were only discovered on three occasions. I the remainder the offending cows had probab been sold. An East Riding cow-keeper, who se two tuberculous cows to a Hull slaughter-hous was fined £25 for failure to notify. A "urinary enteric carrier, who was under observation in 192 was to be considered free from infection if fo consecutive negative tests were obtained; after thr negative tests in August and September, the Octob sample proved positive and he is still under observ tion. It has been decided to erect an orthopæd hospital of 100 beds adjoining the sanatorium ar isolation hospital at Cottingham. There is a striki reduction in the notifications of ophthalm neonatorum during the last two years. During 192 651 cases were admitted to the maternity home for co finement and there were no maternal deaths. Ear induction of labour was needed for 37 of the case and 32 of the babies were discharged alive. Of th five infants who were lost, one was the baby of a epileptic, one of a patient suffering from seve albuminuria, one was macerated and two died pemphigus neonatorum. About 25 per cent. of th expectant mothers attended a municipal antenat clinic. Among the 1561 women who so attende there were only two maternal deaths—i.e., one dea for 780 confinements—whilst among those who d not attend a clinic, there was approximately o death for 197 confinements.

INFECTIOUS DISEASE IN ENGLAND AN WALES DURING THE WEEK ENDED JULY 27TH, 1929.

Notifications.—The following cases of infectio disease were notified during the week:—Small-po 129 (last week, 144); scarlet fever, 1764; diphtheri 933; enteric fever, 58; pneumonia, 852; puerper fever, 35; puerperal pyrexia, 97; cerebro-spin fever, 12; acute poliomyelitis, 12; acute poli encephalitis, 1; encephalitis lethargica, 20; dysenter 4; and ophthalmia neonatorum, 120. No case cholera, plague, or typhus fever was notified duri the week.

The number of cases in the Infectious Hospitals of t Metropolitan Asylums Board on July 30th–31st was follows:—Small-pox, 161 under treatment, 9 under observ tion (last week 173 and 3 respectively); scarlet fever, 142 diphtheria, 1626; enteric fever, 12; measles, 317; whoopin cough, 330; puerperal fever, 25 (plus 12 babies); encephali lethargica, 123; "other diseases" 24. At St. Margare Hospital there were 15 babies (plus 9 mothers) with ophth mia neonatorum.

Deaths.—In the aggregate of great towns, includi London, there was 1 (1) death from small-pox, 3 from enteric fever, 33 (5) from measles, 7 (3) fro scarlet fever, 24 (5) from whooping-cough, 13 from diphtheria, 44 (10) from diarrhœa and enteri under two years, and 20 (3) from influenza. T figures in parentheses are those for London itself.

Liverpool reported 7 deaths from measles, and Manches and Bradford 3 each. Liverpool also reported 5 deat from diarrhœa and enteritis, and Manchester and Salfo 3 each.

The number of stillbirths reported during the we was 244 (corresponding to a rate of 35 per 10 births), including 34 in London.

BRITISH DENTAL HOSPITAL.—The annual repo of this institution, the primary object of which is the esta lishment of centres at which dental treatment is availa for persons unable to pay for private treatment, shows th last year the number of patients' attendances was 19,4 There are nearly a score of treatment centres and clinics various parts of London, some of them with materni tuberculosis, and children's departments; at the Lewish L.C.C. school dental, minor ailments, and aural central cli there were 4815 attendances. Arrangements are being ma for the establishment of additional clinics, and for t treatment at reduced fees of adolescents between the a of 16 and 21, who are ineligible for dental benefit. Adol cents between the ages of 14 and 16, who are not insu persons, are already provided for by the hospital.

EXHIBITION
OF
DRUGS, SURGICAL INSTRUMENTS, FOODS, AND APPLIANCES AT THE BRITISH MEDICAL ASSOCIATION MEETING.

THE exhibition in the City Exhibition Hall, Manchester, which was open from July 22nd to 26th, was unusually complete and well arranged and gave practitioners attending the annual meeting of the B.M.A. an opportunity of refreshing their memory of products and appliances new and old. Ample space was provided for the exhibits and in every case the attendants were ready with expert advice. It is impossible to do more than indicate some of the products which attracted attention.

DRUGS AND PHARMACEUTICAL PREPARATIONS.

1. *General Drug Exhibits.*

[12] and [35] Oppenheimer, Son and Co., Ltd. (179, Queen Victoria-street, E.C. 4), showed a series of preparations with the hall-mark "O.S. & Co.," including Roboleine and Vitad, the latter being the unsaponifiable fraction of cod-liver oil containing a high concentration of vitamins A and D, a palatinoid being equivalent to one-half or a whole teaspoonful of cod-liver oil.—[23] Bayer Products, Ltd. (19, St. Dunstan's-hill, E.C. 3), drew attention to a range of well-tested synthetic remedies including Adalin, Helmitol, Luminal, Phanodorm, and especially Avertin, a basal anæsthetic administered per rectum with advantages alike for surgeon, patient, and anæsthetist; also the Iso-double ampoule of Neo-salvarsan.—[33] The Saccharin Corporation, Ltd. (72, Oxford-street, W. 1), showed among their specialties Novocain, Glaucosan, Trivalin, and Causticin.—[36] Boots Pure Drug Co., Ltd. (Nottingham), had a large exhibit of fine chemicals and packed specialties including Sulphostab and Stabilarsan, an improved "914" for intramuscular injection, approved by the Ministry of Health. Bismostab contains a high concentration of metallic bismuth in isotonic glucose. Among other preparations Hexylresorcinol and Acriflavine were shown as well as Ephedrine and Insulin, at a present price to the patient of 1*s.* 8*d.* per 5 c.cm. ampoule of 100 units.—[48] Burroughs Wellcome and Co. (Snow Hill Buildings, E.C. 1) exhibited products resulting from recent scientific research and other preparations of outstanding importance in various branches of medicine, including micro-organism displays of scarlet fever, diphtheria, syphilis, influenza, pneumonia, leprosy, tuberculosis, and malaria. A number of plants selected from their Dartford farm reminded visitors that certain alkaloid-yielding plants can be cultivated to perfection in England.—[49] Sandoz Chemical Works (5, Wigmore-street, W. 1) had on view a new method of administering allium sativum and examples of Calcium-Sandoz, Sandoptal, Felamine, Femergin, Lobeline, and Scillaren.—[50] Schering, Ltd. (3, Lloyd's-avenue, E.C.3), called attention to Veramon as a safe and successful analgesic, Atophan, a popular uric acid eliminant, and Solganal, a new gold product of low toxicity for intravenous injection in tuberculosis and leprosy.—[61] and [62] Crookes Collosols (22, Chenies-street, W.C. 1) were showing original colloidal preparations for medicinal use with especial emphasis on Collosol Calcium, as employed in osteomalacia, tuberculosis, urticaria, and menorrhagia.—[67] Hoffmann-La Roche Chemical Works, Ltd. (51, Bowes-road, N. 13), over and above the well-known Omnopon total opium alkaloids, Sedobrol sedative bouillon, exhibited a tasteless non-toxic aperient known as Isacen with the composition diacetyl-di-hydroxy-phenyl-isatin. They also supply Thyroxin.—[70] Reynolds and Branson, Ltd. (Leeds), had on view a large series of elixirs, liquors, syrups, and tablets along with a vaccine for rheumatoid arthritis.—[71] May and Baker, Ltd. (Battersea, S.W. 11), commenced an exhibit with Novarsenobillon, Metarsenobillon, Metarseno-argenticum, running on through Stovarsol, Tryparsamide, and Stovaine to a series of vaccines and other remedies.—[73] Allen and Hanburys, Ltd. (48, Wigmore-street, W. 1), in addition to the various Allenburys foods and the "Byno" series of tonics, showed a number of "Polyglandin" preparations, as well as Insulin, Chrismol, liver products, and a selection of sera and vaccines prepared by the Lister Institute.—[76] Evans, Sons, Lescher, and Webb, Ltd. (50, Bartholomew-close, E.C. 1), demonstrated specialties manufactured at Liverpool and Runcorn. The biological products included Hepatex, a convenient form of liver extract for oral administration, Hæmex, and Infundibulin; among pharmaceutical specialties was Bi-drox, a stable form of hydrogen peroxide.—[85] Parke, Davis and Co. (50, Beak-street, W. 1) had on view many preparations manufactured at their Hounslow laboratories, including Metatone, Alophen pill, and Cascara evacuant. Their standardised cod-liver oil contains in each fluid ounce at least 13,500 units of vitamin A and 3000 units of vitamin D. Gland preparations included Estrogen, an extract of reproductive gland tissue, standardised in terms of rat units; also Pituitrin, Pitocin, Pitressin, and a preparation known as Thio-Bismol for intramuscular injection which being water- and tissue-fluid soluble is painless.—[91] Hough, Hoseason and Co., Ltd. (Bridge-street, Manchester), showed pharmaceutical specialties including elixirs of Formasal, Uralia, Lecitone, and Cardiotone.—[97] C. J. Hewlett and Son, Ltd. (35, Charlotte-street, E.C. 2), had a large exhibit of original preparations including Antiseptic cream, Liquor santal, Mist. pepsinæ co., Mist. damianæ co., and Hormonigen.—[99] British Drug Houses, Ltd. (City-road, N. 1), illustrated their pioneer work in the synthesis of vitamin D and the manufacture from natural sources of vitamins A and B, with an exhibit of Radiostol, Radiostoleum, and Radio-Malt. Other products shown were Acetylcholine, Liver Extract, Ephedrine, and Thyroxine.—[108] Lambert Pharmacal Co. (St. Louis, Mo. Agents: S. Maw, Son and Sons, 7–12, Aldersgate-street, E.C. 1) exhibited Listerine Brand antiseptic and demonstrated its germicidal action on various bacteriological cultures.

2. *Special Drug Exhibits.*

[11] Reed and Carnrick (Jersey City, U.S.A. Agents: Coates and Cooper, 41, Great Tower-street, E.C. 3) offered samples of such glandular preparations as Peptenzyme, Nephritin, Protonuclein, Pancrobilin, and Trophonine.—[30] Bristol-Myers Co. (112, Cheapside, E.C. 2) offered Sal Hepatica, Ipana tooth-paste, and Ziratol, a non-toxic hæmostatic antiseptic.—[31] J. F. Macfarlan and Co. (32, Bethnal Green-road, E. 1) exhibited Opoidine, a British preparation of alkaloids of opium, and catgut ligatures in glass tubes in American style, prepared according to Lister's and other formulæ.—[32] Anglo-American Oil Company, Ltd. (Camden Town, N.W. 1), had on view three well-established preparations: Nujol, an intestinal lubricant, Mistol, a combination of menthol, camphor eucalyptol, and chlorbutol for use in an atomiser, and Flit, a liquid insectide in spray form.—[53] Bemax Sales, Ltd. (7, St. James's-street, S.W. 1), called attention to a natural vitamin food and tonic in highly concentrated form. A month's supply of Bemax for an adult costs 2*s.* 6*d.*—[54] Fassett and Johnson, Ltd. (86, Clerkenwell-road, E.C. 1), besides Angier's Emulsion, Bemax, and Californian Syrup of Figs, showed a large range of Seabury and Johnson's plasters.—[58] Kaylene, Ltd. (7, Mandeville-place, W. 1), offered a colloidally reversible hydrated silicate of alumina of great purity and other combinations of Kaylene, as well as Colonol Liquid Paraffin.—[60] Scott and Turner, Ltd. (Gallowgate, Newcastle-on-Tyne), showed Andrews Liver Salt, a pleasant saline aperient with brisk effervescence, leaving a clear solution.—[64] and [65] Deshell Laboratories, Ltd. (Braydon-road, N. 16), offered the Petrolagar Brand Emulsion, for the treatment of intestinal stasis, containing 65 per cent. of pure medicinal paraffin

atomised by hydraulic pressure and held by an emulsion of agar-agar. Four different formulæ are available.—[77] and [78] Armour and Co., Ltd. (St. Martin's-le-Grand, E.C. 1), had an exhibit of preserved glands in natural colours and offered Glanoid medicinal products of animal origin with a special demonstration of liver products.—[89] C. R. Harker, Stagg and Morgan, Ltd. (London, E. 1), offered their entirely British Petrolax, an emulsion containing 65 per cent. pure liquid paraffin of high viscosity, combined with agar-agar and free from starchy matter.—[95] Virol, Ltd. (Hanger-lane, Ealing, W. 5), besides their special combination of marrow fat, malt extract, eggs, lemon syrup, salts of lime and iron, showed also Virolax, a liquid paraffin containing 40 per cent. of virol, recommended for use in intestinal toxæmia and the disorders arising therefrom.—[101] The Regulin Syndicate, Ltd. (W. Bredt, 41, Great Tower-street, E.C. 3), offered Regulin (Helfenberg) for the regulation of intestinal function, consisting of agar-agar with 3½ per cent. extract of cascara; also Blutan, Pneumarol, and Valofin.

3. *Toilet Preparations.*

[57] Kolynos Inc. (Chenies-street, W.C. 1) presented their dental cream, containing antiseptic properties without grit, as well as a denture powder and a skin soap.—[88] The Pepsodent Co. (8, India-street, E.C. 3) offered a dentifrice with an acid reaction, due to the presence of fruit acids, and a polishing agent composed of tricalcium phosphate and calcium sulphate.

Food and Drink.

[5] H.A.G. Coffee Co., Ltd. (40, Theobalds-road, W.C. 1), demonstrated a caffein-free coffee, cleansed also of impurities such as wax, without affecting the flavour or aroma.—[9] Stower's (Alex. Riddle and Co., Ltd., Bancroft-road, E. 1) showed a lime-juice cordial, first introduced in 1862, with the newer concentrated unsweetened juice, as well as lemon- and orange-squashes.—[20] Montgomerie and Co., Ltd. (Ibrox, Glasgow), showed Berina foods for infants and invalids, and Bermaline bread.—[21] Saorstát Eireann (15, Regent-street, S.W. 1) had excellent samples of creamery butter, dried and condensed milk, honey, and eggs from the Irish Free State.—[25] Cow and Gate, Ltd. (Guildford), added to their usual display Lacidac, a lactic acid milk powder, and Hemolac, a milk food for the treatment of nutritional anæmia in infancy.—[27] Sister Laura's Infant and Invalid Food Co., Ltd. (Bishopbriggs, near Glasgow), invited the medical profession to sample a food to be used with fresh undiluted cow's milk.—[37] and [40] Nestlé and Anglo-Swiss Condensed Milk Co. (6, Eastcheap, E.C. 3), besides their standard milk, milk food, and pure thick cream, displayed Lactogen, a dried milk modified by the addition of lactose and made on modern principles.—[39] Ingram and Royle, Ltd. (45, Belvedere-road, S.E. 1), brought forward numerous imported mineral waters, including Vichy-Celestins, Contrexeville "Pavillon," Evian Cachat, Carlsbad, and Hunyadi János.—[51] Oxo, Ltd. (Thames House, Queen Street-place, E.C. 4), showed Oxo, Oxo Cubes, Hospital Oxo, and Lemco, along with three organic extracts Oxoid, Liveroid, and Splenoid.—[56] Maison Ackerman-Laurance (St. Hilaire-street, Florent, near Saumur, France) gave special prominence to their exhibit of sparkling Saumurs, whilst on the same stand Messrs. Francesco Cinzano (Turin) exhibited their Italian vermouth.—[59] Energen Foods Co., Ltd. (Willesden, N.W. 10), showed the Energen bread and other foods, originally prepared for diabetic patients, now designed for the dietary of other metabolic disorders; also a series of Energen cereals.—[79] Vitalia, Ltd. (17A, Boniface-street, Westminster Bridge-road, S.E. 1), called attention to a meat juice prepared by a cold process which retains the natural vitamins and organic salts.—[90] Benger's Food had its usual display jars, showing the special features of the food, along with other products such as Liquor pancreaticus, Liquor pepticus, and Liquor thyroidin.—[92] Plasmon, Ltd. (66A, Farringdon-street, E.C. 4), called attention to an analysis of Plasmona, a concentrated and easily assimilable food preparation containing lipoid, liver, and protein components; also to Splenex, a pure extract from the spleen of the calf.—[94] Cadbury Brothers, Ltd. (Bournville), gave free sample cups of Bournville cocoa and showed other interesting products of the chocolate industry.—[102] Hovis, Ltd. (Macclesfield), demonstrated the processes used in manufacturing their well-known flour and offered samples for tasting.—[105] Frank Cooper, Ltd. (Victoria Buildings, Oxford), described the manufacture of "Oxford" marmalade and fresh fruit preserves.—[107] Jewsbury and Brown, Ltd., exhibited their Citoda water, a special soda water for medical purposes. They supply non-alcoholic wines and cordials.—[113] William Gaymer and Son, Ltd. (Attleborough and London), had their usual exhibit of dry cyder made from English apples.

Surgical Instruments.

[6] Charles F. Thackray (Park-street, Leeds) had a compendious exhibit of instruments for abdominal and general surgery, with equipment of modern design for operating units.—[17] London Surgical Supply Co. (45, Church-road, N. 1) displayed a fine series of cystoscopes, sigmoidoscopes, urethroscopes, and bronchoscopes with a special collection of genito-urinary instruments, a large proportion of them being of stainless steel.—[22] Albert Browne, Ltd. (Chancery-street, Leicester), demonstrated Freund's new hysteroscope for detecting placental remains, and Zeiss's Evacuator for removal of fragments of stone under optical vision.—[24] Arnold and Sons (John Bell and Croyden, 50, Wigmore-street, W. 1) had on view every form of surgical equipment including their pedestal operation table on an oil-pump base, electrical instrument sterilisers, French's venesection apparatus, special syringes for varicose vein injection, and a series of ligatures and sutures subjected to strict bacteriological tests in their own laboratories.—[26] John Weiss and Son, Ltd. (287, Oxford-street, W. 1), displayed several new additions to their range of ophthalmic instruments and appliances, as well as equipment for the general surgeon, such as Robert Jones's bone instruments, Harrison's urethroscope, Putti's tourniquet, and Wilfred Harris's needles for trigeminal injection.—[28], [29], and [45] Mayer and Phelps (59, New Cavendish-street, W. 1) had a large selection of instruments and apparatus of original design for general and regional surgery, many in stainless steel. Popper's hæmostatic guillotine, an ingenious device crushing with 200 lb. pressure, and Lambert Rogers's skull plough with protective guard for the dura deserve special mention.—[41] F. C. Rein and Son (30, Charing Cross-road, W.C. 2) displayed their Diatonic Audiometer and an advanced type of hearing device known as the Viteron Compensator Model.—[47] Down Brothers, Ltd. (21, St. Thomas's-street, S.E. 1), had an exhibit covering the whole field of general and special surgery including Souttar's craniotomy instruments, Sinclair's instruments for fractures, Lane Joynt's skin-grafting instruments, Reavell Moseley electric suction apparatus, and much else.—[66] General Acoustics, Ltd. (77, Wigmore-street, W. 1), displayed Acousticon aids for the deaf with 50 different electrical types, each of which can be regulated in 110 degrees of volume.—[68] J. Gardner and Son (22, Teviot-place, Edinburgh) included in a comprehensive selection of instruments Fraser's laminotomy forceps, Wilkie's abduction splint, Douglas Guthrie's retractor and tongue forceps, and many others.—[72] Allen and Hanburys, Ltd. (48, Wigmore-street, W. 1), had on view the St. Bartholomew's Hospital latest model operation table with self-locking device and head clamp, instrument cabinets and tables in non-corrodible metal, and instruments for the introduction of radium needles and radon seeds.—[75] The Holborn Surgical Instrument Co., Ltd. (26, Thavies Inn,

E.C. 1), showed chrome-plated surgical instruments of all descriptions with electric diagnostic outfits and other devices.—[84] Billings and Sons, Ltd. (305, Oxford-road, Manchester), offered a number of improvements in surgical instruments and appliances such as Eve's Halometer, Wrigley's tonsil guillotine, Sankey's warm ether vapour apparatus, and Scannel's new apparatus for whole blood transfusion.—[96] R. H. Dent (309, Oxford-street, W. 1) displayed the latest models of the Ardente range of hearing aids.—[106] The Genito-Urinary Manufacturing Co., Ltd. (28A, Devonshire-street, W. 1), showed a range of special instruments, cystoscopes, lithotrites, and instruments for the application of radium.—[114] James Woolley, Sons and Co., Ltd. (Manchester), besides a large exhibit of galenicals, also showed surgeons' bags, stainless steel surgical instruments, blood transfusion apparatus, sterilisers, and syringes.

Surgical Aids: Hospital and Laboratory Equipment.

[2] The Dowsing Radiant Heat Co., Ltd. (91, Baker-street, W. 1), illustrated many medical applications of heat including the Ultradescent Luminous Heat Ray Appliance with vita-glass bulb. Their Subaqueous Bath fittings permit of airtight and watertight colonic irrigation free of smell.—[4] Restiform Specialities, Ltd. (Pembroke-place, Liverpool), demonstrated a hospital bed so constructed that the patient merely by his own movement can at will adjust the angle at which he is lying through seven positions.—[8] Whitfield's Bedsteads, Ltd. (109, Watery-lane, Bordesley, Birmingham), had a selection of "Lawson Tait" bedsteads and a special bed-lifter.—[14] Campoirette, Ltd. (252, Regent-street, W. 1), showed the Camp Physiological Supports for abdominal treatment.—[15] Antiphlogistine was displayed as the best-known method for the continuous application of moist heat. By osmosis and cutaneous stimulation it maintains the circulation and aids in eliminating toxins.—[16] Short and Mason, Ltd. (Macdonald-road, Walthamstow, E. 17), exhibited a series of accurately calibrated "Tycos" instruments—sphygmomanometer, thermograph, micro-barograph—as well as urinalysis glassware.—[34] Holophane, Ltd. (Elverton-street, S.W. 1), demonstrated the transmission by ultra-violet rays of Holviglass, which is colourless, permanent, and stronger than ordinary glass.—[42] Ronuk, Ltd. (Portslade, Sussex, and 16, South Molton-street, W. 1), showed their floor polish and preservative stain, together with weighted polishing brushes suitable for hospitals.—[43] Cambridge Instrument Co., Ltd. (45, Grosvenor-place, S.W. 1), laid emphasis on their Portable Electrocardiograph which weighs in all 110 lb. and has most of the virtues of the standard pattern.—[46] Chas. Hearson and Co., Ltd. (24, Fenchurch-street, E.C. 3), had a display of Research Apparatus, pathological, biological, bacteriological, and biochemical, and a good selection of well-known makes of microscope, and were demonstrating Venules.—[52] The Inhaling Drug and Apparatus Co., Ltd. (Windsor House, Victoria-street, S.W. 1), showed the Spiess-Drager apparatus for nebulising various medicaments in a current of oxygen, the diameter of the particles being in the neighbourhood of 10 μ.—[63] H. E. Curtis and Son, Ltd. (7, Mandeville-place, Wigmore-street, W. 1), exhibited their devices for securing the support of ptosed organs and various forms of hernia.—[74] J. Nesbit-Evans and Co. (Wednesbury, Staffs.) showed many kinds of bedstead, including the "Anti-accident" children's cot and the 'Hey-Groves" Special orthopædic bedstead.—[81] and [82] The "Vita" Glass Marketing Board (Aldwych House, W.C. 2), describing their product as the only British window glass admitting the natural health-giving rays of sunlight, announced that already over 100 schools and nearly 200 hospitals have been fitted with it.—[98] Spencer Corsets, Ltd. (Banbury, Oxon., and 96, Regent-street, W. 1), had a variety of surgical supports and garments including a corset for the treatment of sacro-iliac strain.—[103] The Condensed Gas Co., Ltd. (171A, Oxford-road, Manchester), showed their novel "Titan-Ese" control valve for gas cylinders which is designed to eliminate all need for elaborate gas stands incorporating fine-adjustment devices. They offered facilities for making apparatus to the purchaser's design.—[112] Theodore Hamblin, Ltd. (15, Wigmore-street, W. 1), set out a large number of ophthalmological instruments and aids—among them the New Lister Morton ophthalmoscope, a convenient Harrison Butler hand slit-lamp, and a tubular resistance for using ophthalmoscopes from the main current. They also showed Speclettes, which are folding spectacles for the pocket.—[115] Kodak, Ltd. (Kingsway, W.C. 2), exhibited X ray negatives on "Dupli-tised" X ray film, together with dental film negatives and cinematographic apparatus and accessories for clinical photography.—[117] Philips Lamps, Ltd. (145, Charing Cross-road, W.C. 2), showed their "Metalix-Portable" X ray apparatus, which can be worked from any electric light socket. Among X ray tubes on view was a deep therapy tube, Type F, for operation at 220,000 volts and a miniature tube for skin therapy by the Bucky method.—[118] Messrs. Schall and Son, Ltd. (75, New Cavendish-street, W. 1), displayed a selection of the X ray and electro-medical apparatus which in their experience is most popular for cottage hospitals and general practice. Their Diathermy Special Surgical Model supplies a cutting current and is designed for the use of surgeons employing the electro-surgical technique described by Harvey Cushing and Wyeth.—[119] Hoskins and Sewell, Ltd. (Bordesley, Birmingham), drew attention to devices by which their hospital bedsteads have lately been improved. They showed a wheeling ward screen and a "Luxor" adjustable bedstead which can be used in seven different positions.

Miscellaneous.

[1] The Medical Insurance Agency (B.M.A. House, Tavistock-square, W.C. 1) offered evidence of its expanding work and of the benefits obtainable by insuring persons or property under its auspices. Grants made to medical and other charities now amount to £22,980.—[44] The Food Education Society (29, Gordon-square, W.C. 1) described its work in arranging lectures and cookery demonstrations, and exhibited useful publications on dietetics and hygiene.—[55] The British Medical Bureau (12, Stratford-place, W. 1) set out advantageous terms on which it assists in the transference of practices and makes arrangements for locum tenents, resident patients, and accountancy.—[69] The Medical Sickness, Annuity and Life Assurance Society, Ltd. (300, High Holborn, W.C. 1), drew attention to their liberal sickness, accident, life, educational, and partnership assurance policies. The Society is now prepared to lend money for house purchase.—[83] The Hot Springs of Bath had an exhibit illustrating their manifold amenities, and [100] Harrogate called special attention to the systematic training of the staff of its bathing establishments.

Many of the principal medical publishers displayed copies of their new books and new editions.

Hospital Coördination at Bristol.—The Bristol Hospitals Representation Committee, which has been considering the best means of coördinating the work of the city's hospitals and medical institutions, has recommended the creation of a hospitals council. It is suggested that the functions of this body should be to collect and publish information as to the hospital needs of the area, the sufficiency of beds and finance, to prevent overlapping, to consider and criticise proposed extensions of existing and the erection of new hospitals, and to propose and advocate such extensions and erections. The scheme has been endorsed by the council of the Lord Mayor's Hospital Committee at a meeting at which Dr. R. A. Askins, the medical officer of health, stated that the Bristol hospitals were in some respects overlapping, and in others competing or not meeting the public demand.

Correspondence.

"Audi alteram partem."

AURAL DISEASE AND BATHING.

To the Editor of THE LANCET.

SIR,—In answer to the inquiry by "F.R.C.P." as to the "special measures to prevent excessive contamination of swimming baths," it may be stated that the system of continuous filtration, disinfection, and aeration provided by the various types of special plant installed for that purpose in a large number of the public baths in London and the provinces has gone far to meet the need for counteracting their pollution, as well as the call for economising the water-supply. Additional precautions, including the direct supervision of bathers before entering the bath, and attention to details of their personal cleanliness, such as are reported to be stringently applied in the United States, though affording further safeguard against risk of contamination, are probably considered too exacting for application in this country and likely to be strongly resented by the British bathing public. It is true that evidence as to the presence or absence of the *B. coli* group is regarded as supplying a convenient standard of bacterial pollution, in addition to the enumeration of the total organisms per c.cm. The standard recommended by the American Public Health Association is that they should not yield more than 1000 organisms per c.cm. after 24 hours' incubation at 37° C. in over 10 per cent. of samples of swimming bath water, with no single count of more than 5000 per c.cm., and the presence of *B. coli* in not more than two out of five samples of 10 c.cm. of water taken on the same day. Unless special investigations are required, particular attention is not usually paid to streptococcal contamination as a routine, although there is little doubt that its presence can be detected without difficulty in subculture tests from the primary plate cultures. As an example may be quoted a qualitative analysis,[1] made some years ago, of water from a small covered swimming bath, detailing the various organisms identified in an approximate count of 4000 colonies per c.cm. Subcultures from a number of scattered colonies showed that over 50 per cent. belonged to the proteus and *B. coli* groups, 12 per cent. were *Staphylococcus pyogenes aureus*, and 4 per cent. *Streptococcus fæcalis*, in addition to a similar proportion of a Gram-negative diplococcus (possibly *Micrococcus catarrhalis*), *Staphylococcus albus*, and *Sarcina lutea*. Chemical analysis also is helpful in affording evidence of degrees of pollution, and, especially when chlorination is used for disinfection, the estimation of the amount of available free chlorine, on account of its bactericidal action, can and should be regularly carried out by simple test, or by the use of the chloroscope, to ascertain that the necessary 0·2 parts per million free Cl is maintained.

The question of the prevention of pollution of swimming baths formed the subject of a detailed discussion at a meeting of the Medical Officers of Schools Association[2] in May, 1927, and was fully reported in the Association's annual report for that year. It is significant that, as compared with the attention paid to the safeguarding of the general public, precautions to ensure the hygienic condition of swimming baths in the great majority of our private and public schools leave much to be desired.

I am, Sir, yours faithfully,

August 3rd, 1929. J. GRAHAM FORBES.

[1] The Pollution of Swimming Baths, School Hygiene, 1912, iii., 79.

[2] See THE LANCET, 1927, i., 1143.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Comdr. A. B. Cox is placed on the Retd. List with rank of Surg. Capt.

ROYAL NAVAL VOLUNTEER RESERVE.

Surg. Sub.-Lt. E. H. Parkinson to be Surg. Lieut.

Proby. Surg. Lt. (D) W. R. Young to be Surg. Lt. (D).

The King has approved of the award of the Royal Naval Volunteer Reserve Officers' Decoration to Surg. Lt.-Comdr. J. Lorimer.

ROYAL ARMY MEDICAL CORPS.

Maj. W. B. Laird retires, receiving a gratuity.

Maj. T. H. Dickson retires on ret. pay.

Lts. G. Anderson, R. J. G. Hyde, and R. V. Franklin to be Capts.

ARMY DENTAL CORPS.

Capt. A. V. Milnes to be Maj.

ARMY RESERVE OF OFFICERS.

Army Dental Corps: H. Wade, late Capt., Ind. Army, to be Capt.

TERRITORIAL ARMY.

Lt. G. W. Robinson to be Capt.

S. Newsom to be Lt.

Capt. G. F. Wilson, having attained the age limit, relinquishes his commn.

Capt. Alexander Graham Bryce (late R.A.M.C.) to be Capt.

Capt. D. Stewart, from T.A. Res. of Off. (4th/5th Bn. R. Scots), to be Lt.

Lt. R. E. Rees (late 5th Bn. R.W. Fus.) to be Lt.

Supernumerary for service with O.T.C.—A. J. Parer to be Lt., supern. for serv. with Med. Unit, Univ. of London Contgt., Sen. Div., O.T.C.

TERRITORIAL ARMY RESERVE OF OFFICERS.

Lt. E. L. Hancock, from the Active List, to be Lt.

RESERVE OF AIR FORCE OFFICERS.

E. J. Mockler resigns his permanent commn. in the Royal Air Force and is granted a commission as a Flight Lt., Class D.i.

INDIAN MEDICAL SERVICE.

Lt. Mohan Lal Ahuja to be Capt.

Lt. (on prob.) F. W. H. Caughey to be Capt. (prov.) (on prob.).

Parliamentary Intelligence.

HOUSE OF COMMONS.

WEDNESDAY, JULY 24TH.

Grinding Wheel Closed at Sheffield.

Mr. HOFFMAN asked the Home Secretary whether his attention had been drawn to the closing of the Corporation-street grinding wheel in Sheffield, which had thrown out of employment 40 to 50 men; and what was the reason for this step taken by the factory inspector.—Mr. CLYNES replied: It is reported to me that the conditions at these premises have been very unsatisfactory, and in particular that some of the most important provisions of the Regulations for the grinding of cutlery and edge tools are not complied with. This Code of Regulations was made as long ago as 1925 to protect the workpeople from the grave danger of silicosis of the lungs; a period of three years was allowed before some of the Regulations became operative, so as to give owners and occupiers of premises an opportunity of making any necessary alterations in the ventilating and other arrangements, but notwithstanding this and repeated warnings from the factory inspector since January last, the owners of the property have now found themselves able to bring it into compliance with the law. In these circumstances the inspector came to the conclusion, which I think was fully justified, that he could not acquiesce in work being continued under these unsatisfactory conditions until the premises were put in order. I am glad to say, however, that the hon. Member would

appear to have been misinformed as to the number of persons likely to be thrown out of employment; the inspector reports not only that the number working there has been much smaller than 40, but that most of these are obtaining, or have obtained, places elsewhere, and that so far as he can judge only three or four are still seeking places.

THURSDAY, JULY 25TH.

Nursery Schools.

Lady CYNTHIA MOSLEY asked the President of the Board of Education whether he could state plans for the more general extension of nursery schools; and whether he proposed to ask for powers to require local authorities to establish nursery schools in their areas.—Sir CHARLES TREVELYAN replied: I am considering the best way of securing an extension of nursery schools, but I cannot make any definite statement before the House rises for the recess.

Contagious Abortion and Malta Fever.

Mr. GUINNESS asked the Minister of Agriculture whether his attention had been drawn to evidence recently published connecting outbreaks of undulant or Malta fever in human beings with the consumption of milk from cattle suffering from contagious abortion; and whether he would take any action to clear this matter up, either by veterinary research or in conjunction with the Medical Research Council.—Mr. BUXTON replied: I understand that the Ministry of Health will shortly issue a report containing the evidence, mainly obtained abroad, on which is based the theory that a form of undulant fever is caused by the bacillus which produces abortion in animals. The publication of this comprehensive report will attract the attention of medical and veterinary practitioners and research workers to the study of this question on which so far as this country is concerned there is at present very little information.

Hospitals and Motor Accidents.

Mr. LOUIS SMITH asked the Minister of Transport whether, in view of the accumulation of accidents directly or indirectly due to motor traffic which had to be treated in the hospitals of the country, often to the exclusion of local patients, he would investigate the possibility of legislation aimed at permitting such hospitals to recover expenses as in the analagous case provided by Section 16 of the Local Government Act, 1929, or by some earmarked addition for the benefit of the hospitals to the statutory motor licence or driver's licence.—Mr. HERBERT MORRISON replied: I am advised that Section 16 of the Local Government Act, 1929, applies to hospitals maintained by local authorities. I do not think that it would be practicable to apply similar provisions to other hospitals or to impose an additional statutory charge for drivers' licences with a view to dividing the proceeds among them.

Manufacture of Vaccine Lymph.

Mr. GROVES asked the Minister of Health if he would supply particulars of the various changes which had been made in the manufacture of vaccine lymph issued by his department since the system of public arm-to-arm vaccination was abandoned.—Mr. GREENWOOD replied: My hon. friend will find a full statement on the technique and procedure adopted in the preparation of vaccine lymph in the Report of the Vaccination Committee, 1928, pp. 15–17.

Vaccination.

Mr. BROAD asked the Minister of Health whether he was prepared to guarantee that any child or person vaccinated with Government lymph would not be seriously injured by the operation; and, if it was not possible, whether he would consider the desirability of introducing legislation to secure that compensation should be given in such cases to the parents or dependents, as the case might be.—Mr. GREENWOOD replied: It is impossible to give an absolute guarantee that no person vaccinated with Government, or any other, lymph will suffer injury, but I may point out that the lymph produced by the Government Lymph Establishment complies in all respects with the standards laid down in the regulations made under the Therapeutic Substances Act. As regards the second part of the question, as at present advised, I could not undertake to introduce legislation on this subject.

Mr. BROAD asked the Minister of Health when rabbits first began to be used in the production of Government lymph supplies; whether any cases of post-vaccinal encephalitis were reported in this country prior to such introduction of rabbits; and whether his medical advisers had considered the desirability of dispensing with the use of rabbits for the purpose in question.—Mr. GREENWOOD replied: Rabbits have been systematically used for this purpose since 1902. No case of post-vaccinal encephalitis was reported in this country until December, 1922. As regards the last part of the question, the desirability of dispensing with the use of rabbits has been considered, but it was not deemed necessary to recommend any change in the present practice.

Pollution of the River Lea.

Major CHURCH asked the Minister of Health whether he was aware that the River Lea from Tottenham lock downwards through the districts of Hackney and Homerton was, and had for many years been, in a foul condition; and whether, as this stretch of the river was a menace to the health of residents near its banks, he would take steps to ensure that the river was restored to a reasonable standard of purity.—Mr. GREENWOOD replied: Several large schemes of sewerage and sewage disposal have been carried out at heavy cost in recent years by local authorities with a view to improving the condition of the river. I am arranging for a visit of inspection in the near future.

Report on River Pollution.

Rear-Admiral BEAMISH asked the Minister of Agriculture whether the report of the Standing Committee on River Pollution, which the Ministry undertook to issue after a decision reached in February, 1928, could now be issued.—Mr. BUXTON replied: The preparation of this report involves an analysis of a large number of river surveys. I anticipate that the draft report will be ready for the consideration of the Standing Committee in the autumn, and the review of river surveys will include those carried out in 1928.

Water Supplies.

Sir WILLIAM DAVISON asked the Minister of Health whether, in view of the menace to the health of London through an impending shortage of water in London, he would make an inquiry as to the amount of water available; and what, if any, restrictions in the use of water were immediately required or contemplated.—Mr. GREENWOOD replied: I am assured that no serious shortage of water in London is to be expected, because of the large storage capacity which has been provided by the Metropolitan Water Board. The restrictions now in force have been imposed because of the very large increase in consumption and to prevent possible difficulties of distribution in certain areas. I understand that no further restrictions are contemplated.

Removal of Panel Practitioners.

Mr. DAY asked the Minister of Health whether he could give the reasons for the removal of the 46 insurance practitioners who had been removed from the medical list since 1913.—Mr. GREENWOOD replied: The reason in each case was that the Minister was satisfied after the prescribed inquiry that the continued inclusion of the practitioner in the medical list would be prejudicial to the efficiency of the medical service of the insured.

War Pensioners and Tuberculosis.

Mr. DAY asked the Minister of Pensions the number of war pensioners suffering from tuberculosis who were at present receiving treatment in sanatoria, and the number of such cases that were in sanatoria attached to a village settlement.—Mr. F. O. ROBERTS replied: The total number of pensioners at present receiving treatment in sanatoria is 1044, of whom, so far as can be ascertained, 68 are in sanatoria attached to village settlements.

Food Council and Milk Prices.

Mr. WISE asked the President of the Board of Trade what was the view of the Food Council concerning the 80 per cent. to 100 per cent. margin over the farmers' prices to be charged by the milk combine and other distributors under the scheme now under consideration; and what he proposed to do.—Mr. W. GRAHAM replied: The scheme under consideration is a complicated one, designed to apply to the milk trade throughout both England and Wales. The Food Council consider it necessary to consult the associations of milk distributors in order to have the details more clearly before them, and the matter will accordingly be discussed with those associations as soon as practicable. The scheme, if approved, would not in any case come into force until Oct. 1st.

All-India Medical Council.

Major GRAHAM POLE asked the Secretary of State for India if the Government of India had made any progress towards the establishment of an All-India Medical Council; and why no steps had been taken to appoint a government commissioner of medical qualifications and standards despite the fact that this appointment was provided for in the existing law and had been approved in principle by the central and provincial governments.—Mr. BENN replied: The Government of India recently convened a conference of representatives of provincial governments to consider

the proposal to create an All-India Medical Council. I have not yet received a report of the conference. I hope to be able shortly to make an announcement regarding the appointment of a Commissioner of Medical Qualifications and Standards.

Removal of Trade Refuse.

Sir GEORGE HAMILTON asked the Minister of Health whether, in view of the divergence of opinion as to the correct definition of trade refuse, he would consider the question of amending Section 42 of the Public Health Act, 1875, and Section 48 of the Public Health Acts (Amendment) Act, 1907, to permit a local authority to treat refuse from shops under the same heading as house refuse and to collect it without charge, thus altering the present situation whereby the refuse from one shop was house refuse and from another shop trade refuse.—Mr. GREENWOOD replied: This matter has already been noted for consideration when an opportunity occurs to amend the Public Health Acts.

Eyesight Injuries in Engineering Workshops.

Mr. JAMES WILSON asked the Home Secretary whether he was aware of the injury caused to the eyesight of employees in engineering workshops through the lodgment of foreign matter in the eye; and whether he would make arrangements for the appointment of an eye specialist in engineering towns, at which such employees could receive treatment on production of their medical card.—Mr. CLYNES replied: I am aware of the liability to eye injuries in many engineering processes, and the first-aid arrangements which are required to be made at every factory provide for the first-aid treatment of these injuries. Arrangements, however, for the provision of any specialist treatment which may be necessary subsequently are outside the scope of the Factory Acts, and all I can offer is to bring the hon. Member's suggestion to the notice of my right hon. friend, the Minister of Health.

Health of Metropolitan Police Constables.

Lieut.-Colonel HENEAGE asked the Home Secretary the hours of employment of police constables of the Metropolitan police on traffic duty; and the number of cases of illness or overstrain which had resulted from these hours.—Mr. CLYNES replied: The duty period is eight hours with a break of half an hour for refreshments. I am informed that there is no evidence of cases of illness or overstrain resulting from the length of the duty period.

Miners and Anthracosis.

Mr. HOPKIN asked the Secretary for Mines if he would assure miners who suffered from anthracosis that they would have compensation at least to the same extent as those who suffered from silicosis and under the same conditions.—Mr. CLYNES replied: By anthracosis I understand the hon. Member to mean the blackened condition of the lungs which is sometimes caused by inhalation, over a considerable period, of coal dust. I have at present no evidence that this condition disables the workman, but an inquiry is in progress under the direction of the Health Advisory Committee of the Mines Department, and the matter will be further considered when the results of this inquiry are available.

THE LATE DR. STANLEY BOTT.

WE have already recorded the death of Dr. Stanley Bott, at the age of 50, after a long period of indifferent health. He was a student of the London Hospital, which he entered in 1900. Qualifying as M.R.C.S. five years later he visited Australia as a ship's surgeon, and then undertook a series of house appointments at Dorchester, Reading, and finally at the Westminster Hospital, where he was resident obstetric officer. With this experience behind him he took over a practice at Caistor in Lincolnshire, in a scattered agricultural district. He had few interests outside his work, on which he was extremely keen, and though a somewhat reserved nature prevented his making many friends, his services were deeply appreciated by patients, whilst his knowledge and solid virtues were appreciated by his colleagues. In 1921, Dr. Bott took the M.D. degree of Durham University. During the war, however, he had been over-burdened by extra duties, and in 1923 he had a serious breakdown in health, and was obliged to give up his professional activities. For the past year or two he had been living at Broadstairs. He leaves a widow.

Medical News.

ROYAL COLLEGE OF PHYSICIANS OF LONDON AND SURGEONS OF ENGLAND.—As the result of the Final Examination, held from July 1st to 24th, the following candidates were approved in the undermentioned subjects, but are not eligible for the diplomas of the Colleges:—

Medicine.—S. Ahmad, Punjab and London; H. S. Atkinson, London; G. O. Barber, Cambridge and St. Mary's; J. E. L. Bendor-Samuel, London; J. H. Bentley, Univ. Coll.; J. G. Bowen, London; G. G. Cameron, Guy's; A. Caplan, St. Bart.'s; G. J. Clarke, Guy's; H. O. Clarke, Dublin; H. W. Davies, King's Coll.; L. Farris, Liverpool and Charing Cross; Doreen P. Firmin, Cambridge and Westminster; J. F. Fisher, St. Bart.'s; A. M. Fratel, Newcastle-on-Tyne; H. S. H. Gilmer, St. George's; R. McN. Glover, Westminster; P. E. Glynn, Leeds; M. B. W. Gray, London; A. Guirdham, Oxford and Charing Cross; Verna Hackett, Westminster; Kathleen M. L. Hall, Royal Free; Cicely L. Hingston, St. Mary's; Mary A. Hughes, Charing Cross; Eugenie C. Illingworth, Leeds; K. S. Keele, Guy's; N. F. Kendall, St. Bart.'s; Mary L. R. Kennard, St. Mary's; E. J. Kerr, Birmingham; A. H. Lendon, Adelaide; A. Lister, London; W. D. Lovelock-Jones, Cardiff and Univ. Coll.; H. S. A. Malik, St. Thomas's; F. N. Marshall, Manchester; P. H. Merlin, Birmingham; Ruth Milne, Royal Free; C. W. Morley, Cambridge and St. Mary's; J. N. O'Reilly, Middlesex; I. E. Phelps, St. Bart.'s; N. L. Price, Bristol; D. S. Raju, Guy's; C. R. Salkeld, St. Thomas's; L. Savronsky, London; S. Scher, Univ. Coll.; K. M. Seedat, Bombay and Charing Cross; Violet R. Sharp, Royal Free; G. C. Sheldon, King's Coll.; C. H. Sherwood, Birmingham; T. Singh, Punjab and Charing Cross; L. A. H. Snowball, King's Coll.; H. J. Stracey, St. Thomas's; J. M. Thomas, Cardiff and Univ. Coll.; V. Thorne-Thorne, Cambridge and St. Bart.'s; and Eileen A. L. Webb, Royal Free.

Surgery.—S. G. Allen, London; G. H. Bateman, King's Coll.; T. S. Belcher, J. E. L. Bendor-Samuel, and J. G. Bowen, London; W. D. Brown, Cambridge and London; P. C. Chakravorty, Middlesex; Rosa E. Chamings, Royal Free; J. L. Clapham, St. Thomas's; A. H. Clegg, Leeds; S. C. S. Cooke, Middlesex; H. D. Cronyn, St. Mary's; T. Davies, St. Bart.'s; N. R. Donald, Liverpool; A. N. Duggal, Lahore; R. M. Ealand, Bristol; A. Eckford, Guy's; L. Gabbé, Cape and Guy's; R. M. Glover, Cambridge and Westminster; P. E. Glynn, Leeds; M. B. W. Gray, London; A. H. Gurney, Cambridge and St. Bart.'s; Y. A. A. Hammouda, Cairo and St. George's; R. D. Harding, King's Coll.; C. C. Harvey, Cardiff and Univ. Coll.; E. Harvey, Middlesex; Columba M. D. Heathcote, Charing Cross; C. F. Hecker, Adelaide and London; L. Hershfield, Middlesex; P. Y. Hicks, St. Thomas's; H. B. Jackson, Middlesex; W. D. G. James, Cardiff and St. Mary's; J. L. Jekyll, Cambridge and London; H. Y. Khwaja, London; A H. Lendon, Adelaide; E. L. Littler and R. W. McConnel, King's Coll.; G. K. McKee, St. Bart.'s; E. J. Mann, Birmingham; E. Marks, St. Mary's; Eileen M. Massey, King's Coll.; E. C. W. Maxwell, St. Thomas's; F. C. Mayo, King's Coll.; P. H. Merlin, Birmingham; L. B. Neel, St. George's; J. E. Newton, Bristol; J. N. O'Reilly, Middlesex; A. P. M. Page, St. Bart.'s; B. W. Paine, Univ. Coll.; L. H. Peiris, Ceylon and King's Coll.; J. Petro, St. George's; J. R. F. Popplewell, Guy's; N. L. Price, Bristol; H. Ramsay and J. Richardson, Middlesex; N. D. Sane and L. Savronsky, London; J. G. Scadding, Middlesex; S. Scher, Cape and Univ. Coll.; D. P. Settna, London; T. M. Spilhaus, St. Thomas's; H. H. L. Spitz, Leipzig and Middlesex; R. Stanley, N. Stevens, and H. J. Stracey, St. Thomas's; A. Taylor, Manchester; D. M. Thomas, Cardiff and Middlesex; E. G. Thomas, Univ. Coll.; K. S. Thompson, London; T. F. Tierney, St. Bart.'s; C. Wall, London; E. M. Ward, St. Bart.'s; V. W. L. Wells, Guy's; L. H. Wharton, Bristol; A. J. White, Middlesex; E. R. Willis and B. Yuill, London.

Midwifery.—W. Addey, Manchester; A. M. M. M. Ali, Middlesex; J. E. G. Baker, London; J. C. Banerjea, Calcutta; A. Barber, St. Bart.'s; G. O. Barber, Cambridge and St. Mary's; J. H. Bartlett, St. Mary's; F. Bartholomew, St. Thomas's; A. K. Basu and J. H. Bentley, Univ. Coll.; M. V. Bhajekar, Middlesex; I. Billig, St. Thomas's; S. Bochenek, St. Bart.'s; C. C. Bryson, Cambridge and Middlesex; D. R. Buchan, Birmingham; A. Burkhardt, Univ. Coll.; C. L. Carter, St. Bart.'s; H. M. Chappel, Univ. Coll.; F. W. Chippindale, Guy's; L. P. Clarke, St. George's; A. F. H. Coke, St. Mary's; H. Coorland, St. Bart.'s; W. H. Croft, Birmingham; T. Davies and A. F. Davy, St. Bart.'s; A. L. Devi, Royal Free; A. N. Duggal, Lahore; M. P. Ellis, Univ. Coll.; E. H. Evans, Univ. Coll.; R. E. M. Fawcett, St. Bart.'s; C. L. Ferguson, London; Catherine F. Forrest, Royal Free; R. H. Franklin St. Thomas's; A. M. Fratel, Bombay and Durham; J. D. J. Freeman and A. J. Gibbs, St. Thomas's; R. T. S. Goodchild, London; D. R. Goodfellow, Manchester; C. G. Gordon-Wilson, and R. K. Goyal, London; A. H. Grace, St. Bart.'s; P. R. Graves, St. Thomas's; Charlotte Gray, Univ. Coll.; Verna Hackett, Westminster, R. H. Hadley, Melbourne; B. Halfpenny, Middlesex; C. J. K. Hamilton, Liverpool; C. C. Harvey, Univ. Coll.; E. Harvey, Middlesex; Rowena M. Hickman, Bristol; Ciceley L. Hingston, St. Mary's; F. K. S. Hirschfeld, Melbourne and London;

B. Horwitz, Cape and London; E. N. Jenkinson, St. Bart.'s; G. L. Johnson, Columbia Univ.; E. K. Jones, London; H. J. Knight, St. Mary's; L. J. Lannaman, St. Bart.'s; P. Lansel, Middlesex; J. B. Lloyd, London; S. McDonald, Durham; J. S. MacVine, St. Bart.'s; Margery L. Maltby, Royal Free; I. W. H. Mansfield, Middlesex; F. N. Marshall, Manchester; F. C. Mayo, King's Coll.; B. R. Medlycott, Guy's; C. W. Morley, St. Mary's; I. B. Morris, Guy's; P. D. Mottet, Univ. Coll.; F. Murray, London; J. E. Newton, Bristol; T. R. Pahwa, Glasgow; C. H. Pauli, Bristol; D. D. Payne, St. Thomas's; W. Phillips, Univ. Coll.; J. O. Poynton, Charing Cross; L. D. Pringle and D. S. Raju, Guy's; H. Ramsay and G. E. Ranawake, Middlesex; P. V. Reading, Guy's; J. M. Reese, St. Mary's; J. I. Rerrie, St. Bart.'s; Colleen Rice, Charing Cross; J. Richardson, Middlesex; J. F. Riches, St. Thomas's; A. H. T. Robb-Smith, St. Bart.'s; T. G. Robinson and L. K. Robson, Guy's; K. M. Ross, St. Bart.'s; J. G. Scadding, Middlesex; S. Schenkman and A. Scher, London; M. Schlaff, St. Bart.'s; J. M. Searle, London; H. Silverstein, St. Bart.'s; C. Skinner, Guy's; Edith M. P. Smith, Charing Cross; B. T. Squires, Guy's; J. E. S. Stephens, St. Bart.'s; A. E. Stevens, London; F. H. Stevenson, Guy's; T. S. Stone, London; G. L. Stroud, St. Mary's; R. F. Taaffe-Finn, St. Bart.'s; K. T. Taskar, London; R. S. Taylor, Middlesex; E. G. Thomas, Univ. Coll.; W. E. Thomas, Cardiff and Bristol; T. F. Tierney, St. Bart.'s; C. Wall, London; Mary J. Westall, Royal Free; A. J. Whitaker, Univ. Coll.; V. M. White, London; T. H. N. Whitehurst, St. Bart.'s; E. G. Wilkins, Middlesex; D. A. Williams, Cardiff and Univ. Coll.; R. C. Williams, St. Thomas's; Rose E. Williams, Royal Free; and T. H. Wilson, St. Thomas's.

Pathology.—E. F. Adams, Manchester; J. E. G. Baker, London; F. Bartholomew, St. Thomas's; A. Burkhardt, Univ. Coll.; F. W. Chippindale, Guy's; A. F. H. Coke, St. Mary's; P. Frankenberg, St. Bart.'s; E. J. Goldsmith, St. Thomas's; R. T. S. Goodchild, London; P. R. Graves and P. Y. Hicks, St. Thomas's; S. W. Holmes, St. Mary's; O. Ive, Guy's; E. K. Jones, London; H. J. Knight, St. Mary's; F. P. L. Lander, Middlesex; L. J. Lannaman, St. Bart.'s; P. A. T. Lowden, St. Thomas's; J. S. MacVine, St. Bart.'s; J. H. G. Mason, Middlesex; I. W. Matheson, St. Bart.'s; J. E. L. Morris, Liverpool; P. D. Mottet, Univ. Coll.; J. M. Reese, St. Mary's; D. Y. Richardson, Durham; H. Silverstein, St. Bart.'s; T. S. Stone, London; Marjorie V. N. Sudds, Royal Free; W. E. Whaite, Manchester; A. J. Whitaker, Univ. Coll.; and T. H. Wilson, St. Thomas's.

THE Royal College of Physicians of London will be closed for the summer vacation from August 12th to Sept. 14th, inclusive.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—An ordinary meeting of the Council was held on August 1st, with Lord Moynihan, the President, in the chair.

Dr. Aly Ibrahim, Dean of the Faculty of Medicine, Cairo, who was elected an Honorary Fellow in November last, attended and signed the Roll of Honorary Fellows.

On the recommendation of the Museum Committee, it was decided to establish a research scholarship of £500 per annum, payable out of the general funds of the College, tenable from year to year, for a period not exceeding seven years.

Membership of the College was conferred on 141 of those whose names appeared on p. 257 of THE LANCET last week, and upon Marjorie E. Roberts, Royal Free Hospital. Diplomas were granted jointly with the Royal College of Physicians, according to the list published on the same page.

The King of Egypt paid a visit to the College on Aug. 2nd, and was made an Honorary Fellow. Lord Moynihan, the President, on presenting the Diploma, referred to the College's close connexion with the Egyptian School of Medicine. Fellows and Members of the College had been teachers in the School, and until recently the post of Dean had been held by an English Fellow. The present Dean, Dr. Aly Ibrahim, had not long ago been made an Honorary Fellow, and within recent years nine Egyptians, trained in the School at Cairo, had become Fellows by examination. He also referred to the great personal interest taken by His Majesty in the Faculty of Medicine at Cairo, and the Kasr-el-Aini Hospital. King Fuad, having signed the Roll of Honorary Fellows, inspected the Museum and other parts of the building.

A MEMORIAL NURSES' HOME.—Princess Mary last week opened a new nurses' home at the Royal West Sussex Hospital, Chichester, which has been built as a memorial to the late Dr. David Ewart, who was for many years associated with this institution as surgeon. The Princess also unveiled a memorial to Dr. Ewart.

A WELSH MATERNITY HOSPITAL.—A maternity hospital is being added to the Montgomeryshire Infirmary, at Newtown, and when the foundation-stone was laid last week by Mrs. David Davies, it was stated that this is the first institution of the kind in Mid-Wales.

EPSOM COLLEGE.—On every recent Founder's Day at Epsom College there has been a steady record of progress, showing that the intimate connexion of the school with medicine is associated with advance in the general status of the College as a public school. Proceedings this year were no exception to the rule. Prior to the prize-giving, the Council entertained 150 guests at luncheon, and over a thousand parents and friends of the College were present on Saturday, July 27th, when Lord Eustace Percy gave away the prizes. In doing so he took as the main point of his address to the boys the need for understanding one's fellow men and women—that he held to be the prime point in what he understood by the word "education." General education meant getting to know men and women, to know the minds of men and women, to sympathise with them, and in the fullest sense to understand them. The world would not fail for lack of specialists, but it might very well fail for lack of people with simple human understanding and the power of handling other fellows. That was the cement that kept society together, and in this country they never needed it more than to-day.

The Headmaster, Mr. Arnold Powell, having detailed the successes of the school during the past year in examinations, Dr. Raymond Crawfurd, Chairman of Council, in moving a vote of thanks to Lord Eustace, referred to the business side of the school's affairs. The scale of masters' salaries, he said, had been considerably increased during the present year, additions had been made to the dietary, and many improvements had been effected for the well-being of the boys, such as alterations in the swimming bath, the provision of an electrolyser for disinfection, the building of a new changing room for one of the houses, the utilisation of Lord Beaverbrook's donation for the furtherance of scientific education, and the provision of a new cricket practice pitch, the gift of Mr. Chudleigh. Referring to changes to take place in the immediate future, he mentioned the building of a new rifle-range, and considerable structural alterations at Wilson House. He hoped, finally, that the building of the new sanatorium would not long be delayed, as, with its completion, the Council would consider their main plans of enlargement to have been brought to a successful conclusion.

During the afternoon the present generation administered a sound hiding to the Old Boys on the cricket field. They declared their first innings closed on the Friday with the fine score of 370 for 3 wickets, to which the Old Boys replied with 302 all out. The College again declared with 210 for 3, and the Old Boys could only total 178 in reply. J. D. W. H. Pettigrew, in the first innings, scored 186 not out for the school, giving only one chance, and C. S. Taylor hit hard in each innings for 83 and 52 not out respectively.

On Saturday evening the College Dramatic Society gave a performance of Mr. Bernard Shaw's "St. Joan."

THE Minister of Health has appointed Mr. H. W. S. Francis to be a Principal Assistant Secretary, and Mr. R. H. H. Keenlyside and Mr. J. N. Beckett to be Assistant Secretaries of the Ministry.

METROPOLITAN ASYLUMS BOARD.—A three months' course of lectures and demonstrations on clinical practice and in hospital administration will be given at the North-Eastern Hospital, St. Ann's-road, Tottenham, N.15, by Dr. F. H. Thomson, the Medical Superintendent, on Mondays and Wednesdays at 4.45 P.M., and alternate Saturdays at 11 A.M., beginning on Wednesday, Oct. 2nd. Particulars may be had from the Clerk to the Board, Victoria Embankment, E.C. 4.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.—A special course in Diseases of Children will be given at the Queen's Hospital for Children from August 12th to 21st. It will occupy the whole of each day with demonstrations, operations, and lectures. Courses in September will be held as follows: Diseases of the chest, Brompton Hospital, Sept. 9th to 14th; diseases of infants, Infants Hospital, Sept. 9th to 21st; psychological medicine, Bethlem Royal Hospital, Tuesday and Saturday mornings, from Sept. 10th to Oct. 5th; medicine, surgery, and the specialties, Westminster Hospital, for men graduates only, Sept. 16th to 28th. An experimental all-day course in gastro-enterology will be given at the Prince of Wales's Hospital, Tottenham, from Sept. 30th to Oct. 4th. Post-graduates interested are asked to apply early for the syllabus. The Metropolitan Hospital, Kingsland-road, will give an experimental all-day course in medicine, surgery, and the specialties, from Oct. 21st to Nov. 2nd. A course for the M.R.C.P., Lond. examination will be given at 8.30 P.M. on Tuesday and Friday evenings, from Oct. 15th to Dec. 6th, at 11, Chandos-street, Cavendish-square, W. Full particulars of all courses are obtainable from the Secretary of the Fellowship, at 1, Wimpole-street, London, W. 1.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY, August 12th, to SATURDAY, August 17th.—QUEEN'S HOSPITAL FOR CHILDREN, Hackney-road, Bethnal-green, E. Special Course in Diseases of Children, Demonstrations, Operations and Lectures. All day Course.—ALL SAINTS' HOSPITAL, Vauxhall Bridge-road, S.W.—Special Course in Urology. Afternoons and evenings.—Further particulars from the Fellowship of Medicine.

Appointments.

JAMESON, R. C., M.D., C.M.Edin., has been appointed Certifying Surgeon under the Factory and Workshop Acts for Leeds North District.

RAWSON, W. F., F.R.C.S. Edin., Hon. Surgeon to the Waddilove Samaritan Hospital for Women, Bradford.

Vacancies.

For further information refer to the advertisement columns.

Barnsley, Beckett Hospital and Dispensary.—H.P. £140.

***Birkenhead General Hospital.*—Cas. S. £100.**

Bolingbroke Hospital, Wandsworth Common, S.W.—H.S. At rate of £120.

Bournemouth, Royal Victoria and West Hants Hospital.—H.S. At rate of £120.

Bradford Children's Hospital.—H.S. and H.P. Each £120.

Bradford, Royal Eye and Ear Hospital.—Jun. H.S. £120.

Burnley, Victoria Hospital.—H.P. £125.

Burton-on-Trent, General Infirmary.—2nd Res. H.S. £150.

Cardiff, King Edward VII. Welsh National Memorial Assn.—Area Asst. Tuber. Physician. £600.

Cardiff City Mental Hospital, Whitchurch.—Res. Clin. Asst. 50 gns.

Carlisle, Cumberland Infirmary.—H.P. Also H.S. to special Departments. Each at rate of £155.

Cheshire Joint Sanatorium, Market Drayton, Salop.—H.P. £250.

Cheshire, Royal Hospital.—Asst. M.O. £350.

Dewsbury County Borough.—Asst. School M.O. and Asst. M.O.H. £600.

East London Hospital for Children, &c., Shadwell, E.—Res. H.S. and H.P. Each at rate of £125.

***Exeter, Royal Devon and Exeter Hospital.*—Asst. H.S. At rate of £100.**

General Lying-in Hospital, York-road, S.E.—Res. M.O. At rate of £100.

Glasgow, Govan District Asylum.—Jun. Asst. M.O. £325.

Golden Square Throat, Nose and Ear Hospital, W.—H.S. £100.

Harrogate Infirmary.—Sen. and Jun. H.S.'s. At rate of £150 and £100 respectively.

Hull Royal Infirmary.—Second H.S. At rate of £150. Also Cas. H.S. At the rate of £130.

Ilford Emergency Hospital.—Hon. Aural S. Also Sen. H.S. £150.

Inverness, Northern Infirmary.—H.P. and Jun. H.S. £100.

***Ipswich, East Suffolk and Ipswich Hospital.*—H.S. At rate of £120.**

Jewish Maternity Hospital, Underwood-street, E.—Res. M.O. At rate of £50.

Leicester, North Evington Infirmary.—Res. M.O. £250.

Lincoln, Bracebridge Mental Hospital.—3rd Asst. M.O. £350.

***Liverpool Open Air Hospital for Children, Leasowe.*—Jun. Res. M.O. At rate of £200.**

Liverpool, St. Paul's Hospital, Old Hall-street.—H.S. £100.

***London Female Lock Hospital, 283, Harrow-road, W.*—H.S. At rate of £150.**

London Temperance Hospital, Hampstead-road, N.W.—Cas. O. At rate of £120.

***Lowestoft and North Suffolk Hospital.*—H.S. £120.**

Manchester and District Radium Institution.—Asst. Radiologist. £250.

Manchester Victoria Memorial Jewish Hospital.—Sen. H.S. £250. Also Jun. H.S. At rate of £125.

Milford, Surrey County Sanatorium.—2nd Asst. M.O. £400.

Miller General Hospital, Greenwich-road, S.E.—Cas. O. At rate of £150.

Nottingham General Hospital.—Asst. Res. Cas. O. At rate of £150.

Nottingham Children's Hospital.—Res. H.S. At rate of £150.

Portsmouth Royal Hospital.—Cas. O. At rate of £100.

Richmond Royal Hospital.—Jun. H.S. £100.

Rochester, St. Bartholomew's Hospital.—H.P. At rate of £175.

Rotherham Hospital.—H.P. £180.

Royal Air Force Medical Service.—Temporary Commissions.

Royal Eye Hospital, St. George's-circus, S.E.—12 Salaried Refractionists. 12 Clinical Assts. Also 1 Pathologist.

Royal Waterloo Hospital for Children, &c., Waterloo-road, S.E.—Clin. Assts.

St. Mary's Parish Infirmary, Highgate-hill, N.—Radiologist. £125.

Scarborough Hospital and Dispensary.—Two H.S.'s Each at rate of £126.

Sheffield, Jessop Hospital for Women.—Sen. Res. O. £250.

Swansea Hospital.—H.S. £150.

Swindon and North Wilts Victoria Hospital.—Hon. Aural Surg.

University College Hospital, Gower-street, W.C.—Asst. Radiologist. £200.

Warwickshire, King Edward VII. Memorial Sanatorium.—Sen. H.P. and Jun. H.P. At rate of £275 and £200 respectively.

Weston-super-Mare, Queen Alexandra Memorial Hospital.—Res. M.O. £130.

West Bromwich and District General Hospital.—H.S., H.P., and Cas. H.S. Each at rate of £200.

West Riding of Yorkshire.—County M.O.H. £1600.

Wigan County Borough.—Clin. Tuber. O. and Asst. M.O.H. £750.

Winchester, Royal Hampshire County Hospital.—Res. H.S. £150.

***Woolwich and District War Memorial Hospital, Shooters' Hill, S.E.*—Jun. H.S. At rate of £125.**

The Chief Inspector of Factories announces vacant appointments for Certifying Factory Surgeons at Carnoustie (Angus) and Ringwood (Hants).

Births, Marriages, and Deaths.

BIRTHS.

BAKER.—On July 30th, the wife of Ormonde A. Baker, M.B., Langton's Meadow, Farnham Common, Bucks, of a son.

CASSELLS.—On July 28th, at The Old Oak House, Pembridge, Herefordshire, the wife of Dr. David A. K. Cassells, of twin sons.

SHAW.—On July 22nd, at Lower Baggot-street, Dublin, the wife of Captain G. W. B. Shaw, R.A.M.C., of a son.

SPENCER-PAYNE.—On July 30th, at Hempsted Lodge, Woodside Park, the wife of A. Ll. Spencer-Payne, M.R.C.S., L.R.C.P., L.D.S., of a daughter.

MARRIAGES.

SALEEBY—BILLINGE.—On July 30th, at St. Augustine's, Kilburn, Caleb Williams Saleeby, M.D., F.R.S.E., to Muriel Gordon, eldest daughter of the late Rev. Robert Burland Billinge, of Ulverston.

DEATHS.

GORDON.—On July 24th, at Pembroke-mansions, Dublin, Thomas Eagleson Gordon, M.Ch., President, Royal College of Surgeons in Ireland, aged 62 years.

HIGHET.—On July 29th, at a London nursing home, Hugh Campbell Highet, M.D., D.P.H., of Radley House, Winchester, late of Bangkok, Siam, aged 62 years.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

INDEX TO "THE LANCET," VOL. I., 1929.

THE Index and Title-page to Vol. I., 1929, which was completed with the issue of June 29th, is now ready. A copy will be sent gratis to subscribers on receipt of a post-card addressed to the Manager of THE LANCET, 1, Bedford-street, Strand, W.C. 2. Subscribers who have not already indicated their desire to receive Indexes regularly as published should do so now.

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Notes, Comments, and Abstracts.

ARROWROOT,

ITS MEDICINAL AND DIETETIC VALUE.

By JOHN CAMPBELL, PH.D.,
HON. SCIENTIFIC ADVISER TO THE WEST INDIA COMMITTEE.

FOR generations genuine arrowroot has been regarded by the medical profession as a valuable food in sick-room dietary. The word "arrowroot" is derived from the Indian term Ara-ruta, meaning a "mealy root," and it well describes the characters of the rhizome of the *Maranta arundinacea*, grown in the British West Indies, from which the genuine arrowroot is prepared. The plant is a native of tropical America and was formerly largely cultivated in Bermuda, but the manufacture of arrowroot has ceased in that island and is now centred in St. Vincent.

The objects aimed at in the preparation of arrowroot are the preservation of its colour and flavour, with the elimination of fibre and the bitter principles which are present more or less in all starch yielding rhizomes and roots. The fresh rhizomes are washed, pared, washed, and then graded to a fine pulp. The subsequent operations involve frequent dilutions with water and straining before passing to the settling table, where the supernatant fluid is drained off. The residue is then washed until the effluent runs clean, after which it is transferred to the drying house and air dried. The colour and flavour depend upon the efficiency of the washing, straining, and settling processes, and the different grades of arrowroot indicate the degree to which the purifying and eliminating processes are carried.

The manufacture of arrowroot as carried out under present conditions in the West Indies is not based on up-to-date methods; no modern machinery is used and the process is laborious and wasteful. Efforts are now being made by the West India Committee to introduce modern machinery, in properly constructed factories, which will reduce the cost of production, and lower the price of this valuable carbohydrate food.

The statement often met with in text-books that arrowroot is specially prone to absorb moisture and foreign flavours is not justified. In a special research inaugurated by the West India Committee it was found that arrowroot starch was neither better nor worse than other starches in that respect, and that this reputation was probably due to the careless way in which arrowroot was formerly packed for export, and marketed in this country.

The following is an analysis of St. Vincent arrowroot compared with potato, maize, and cassava starch.

Analyses (*Willimott*).

—	St. Vincent arrowroot.	British arrowroot.		Brazilian arrowroot (cassava starch, Manihot utilissima.)
		Potato starch.	Cornflour (maize starch).	
Moisture ..	15·15	16·20	11·91	14·16
Protein ..	0·10	0·12	0·40	0·18
Fat ..	0·02	0·03	0·10	0·03
Starch ..	84·45	83·37	87·37	85·41
Fibre ..	0·03	0·03	0·05	0·03
Ash ..	0·25	0·25	0·17	0·19
—	100·00	100·00	100·00	100·00

The energy value of St. Vincent arrowroot is 112 calories per ounce. The analysis shows it to be a very pure amyloid food, characterised by an extremely low protein and fibre content; this confirms the statement of most authorities that it leaves practically no residue in the digestive tract. The ash contains calcium, potassium, and iron as phosphates, chlorides, and silicates. The phosphorous content of the ash amounts to 21·2 per cent.

In most text-books the vitamin content of arrowroot is given as nil, but recent experiments made at the Lister Institute appear to show that root starch—i.e., arrowroot—contains a hitherto unnoticed constituent not present in cereal starch. When the protein of the rat diet is dried before being added to the daily ration, certain deficiencies in the nutrition are evident. If, however, arrowroot starch is added to the diet as a carbohydrate constituent, this deficiency is rectified, but not by wheat, rice, or maize starch. The nature of this constituent has not been determined, but if not an actual vitamin, it has an allied action.[1]

[1] See Bio-chemical Journal, 1927, xxi., 713.

The most important property of starch is the quality of forming with water a jelly at a temperature which varies for the different varieties of starch. The starch molecule is generally considered to consist of amylose, found principally in the internal part of the grain, and amylopectin found mainly externally. The amylopectin confers the property of gelatinisation. The amylose is the "granulose" and the amylopectin the "farinose" of the older nomenclature. From the dietetic standpoint the gelatinising properties are the more important, as they concern the breaking up and bursting of the granules and the setting free of the nutrient constituents for digestion. The more thorough the gelatinisation the more rapid and thorough the assimilation and the less the residue of undigested matter. As an average of many tests Willimott obtained the following gelatinisation point of the named starches:

St. Vincent arrowroot..	73° C.	Maize	70° C.
Cassava	66° C.	Potato	65° C.

The high gelatinisation point of St. Vincent arrowroot ensures a thorough breaking down of the starch granules and confirms the observation that arrowroot is the most digestible form of starch.

This conclusion is confirmed by the researches of A. Dobroslavine who found that arrowroot required less saliva to produce a given quantity of sugar than all other starches, and that equal quantities of saliva acting on arrowroot and other starches produced more sugar in the arrowroot digestion in a shorter time than in cereal starches.[2]

In the earliest references the term "arrowroot" was reserved for the starchy products of the various species of the *Maranta*, especially *arundinacea*. Among the substitutes for genuine arrowroot are the following: "British arrowroot" is merely potato starch. "Cornflour" is prepared from maize, and is sometimes sold as "British arrowroot." "Brazilian arrowroot" is the starch prepared from manioc (*Cassava-Manihot utilissima*). Tapioca is prepared from this starch by the addition of water, and drying by heat. Formerly the *Maranta arundinacea* was a source of "Australian arrowroot," but of late years the species Canna has replaced it, the chief being *Canna edulis*, commonly known as tous-les-mois. "East Indian arrowroot" is prepared from various species of *Curcuma*, such as *angustifolia*, *leucorrhiza* and *rubescens*. It is one of the most common adulterants of genuine arrowroot. Another form also termed "East Indian arrowroot" is manufactured in Southern and Eastern Asia, Madras, and the Malabar Coast from Travancore starch. It is known locally as tik-tikur. "Portland arrowroot" is prepared from the lily *Arum maculatum* and the tubers of the *Arum macrorhizum*, yielding 20 per cent. of starch, cultivated in the island of Portland and other South Sea islands, and in India. It is used often as an adulterant of genuine arrowroot. "Tahiti arrowroot" is prepared from the species *Tacca oceanica* or *T.-pinnatifida*. Locally it is known as "pia." Its starch yield averages 28–30 per cent. "Guiana arrowroot" is the starch prepared from the yam (*Dioscorea alata*). In Brazil it is known as farinha-de-cara. It gives a 20 per cent. yield of starch. "Florida arrowroot" or Zanna starch is derived from the tuberous stems of the *Zanna floridana*.

These substitutes, especially the preparations from maize and potato, do not possess the dietetic properties of genuine arrowroot. It is therefore desirable that in all cases "St. Vincent arrowroot" should be specified.

Arrowroot is a valuable food in diarrhœa, those cases where vegetable fibre is contra-indicated, and where a diet is required leaving no residue in the alimentary tract. When used in small quantities in conjunction with milk and heated to the gelatinising point of the starch, it breaks up the coarse curd rendering the milk more digestible. With agar-agar it forms an excellent base for the administration of the mineral salts used in the radiography of gastro-intestinal disease.

[2] Bull. Soc. Chem., 1887, xxv., 452.

THE READESK.

WE have received from Mr. W. Ross Key, of 97, Douglas-street, Glasgow, a sample Readesk, which is an apparatus for holding a book securely and at a proper distance from the eyes when reclining in a chair at any angle or resting on a bed. It consists of an expanding frame (on the principle of the "lazy tongs") for holding the book, with pins to hold down the pages, the frame being kept in a comfortable angle before the face by a cord passing round the neck of the reader. Some little pains have to be spent at first in adjusting the apparatus, but when once in position it is quite satisfactory in use, and should prove a boon not only to invalids, but to readers who like to have a hand free when smoking.

TREATMENT OF ITCHING DERMATOSES.

ACCORDING to M. Friedlander,[1] Lebedjew was the first to try intravenous injections of a 10 per cent. sodium bromide solution in pruriginous affections, and his results led to a scientific enquiry in Vienna, where the advantages of the method were confirmed. Ekzebrol, which is a 10 per cent. solution of strontium bromide in 20 per cent. glucose solution, was the direct outcome of these investifgations, and is prepared for the market by the firm of Tosse (Hamburg.) The drug is administered exclusively by the intravenous route, and during the injection gives rise to a feeling of warmth, which spreads rapidly over the whole body, and of which the patient must be warned. Friedlander has never noted any ill-effects, and in one or two cases without prominent veins he has even ventured to inject the drug deeply into the glutei. This route, however, is painful, and the patients did not submit to more than two injections. The usual procedure is to administer a 10 c.cm. ampoule three times a week.

The results are described as variable. Sometimes the pruritus was controlled after three injections, in other cases as many as 16 had to be given before the symptom disappeared. Ekzebrol, it is stated, can be used both in primary general pruritus of unknown or obscure ætiology, and in that which follows or is associated with psoriasis, lichen ruber planus and eczema. Failures of course occur with this, as with all other methods, if the cause cannot be ascertained and removed.

PUBLIC HEALTH IN KENYA.

A REPORT on the Colony and Protectorate of Kenya, recently issued, states that the land area is 221,800 square miles in extent, and the water area, which includes the larger portion of Lake Rudolf and the eastern waters of the Victoria Nyanza, 4011 square miles. Mount Kenya, after which the colony is named, is 17,040 feet in height, and is capped by perpetual snow and ice. There are no marked seasonal changes such as winter and summer. At high altitudes the diurnal variation of temperature is high, being as much as 30°F. in some places, but the mean temperature varies little from month to month. The range of temperature between different parts of Kenya is very wide. At Lamu, on the coast, the mean shade temperature is 80° F. At Mombasa it is 77°F. In Kisamu, on the Victoria Nyanza it is 72·5°F. In the Rift Valley and highland areas the mean temperature is normally between 58°F. and 65°F. The rainfall is generally well distributed. Precipitation varies considerably with the physical configuration of the colony. According to a census taken in 1926, the number of Europeans in the colony was 12,529, of Asiatics (excluding Arabs), 30,583, and of Arabs 10,577, whilst the estimated African population in 1927 was 2,847,632.

In the section of the report devoted to public health it is stated that after the visit to the colony of Dr. J. B. Orr, of the Rowett Research Institute, in 1926, in connexion with the proposed pasture investigation, the subcommittee of the Civil Research Committee decided to extend the scope of the investigation to problems of human as well as animal nutrition. With funds provided by the Empire Marketing Board, two special research officers have been employed in the country, not as independent investigators, but working in closest collaboration with the local people. During 1927 two new centres, namely Kitui and Teita, were opened in the Native Reserves. A medical officer of health has been appointed to Nakuru, on account of the considerable development which is taking place in the township, and also because of the urgent necessity of instituting sanitary measures at this centre of the grain trade. Besides his duties at Nakuru, the medical officer has been responsible for both Eldoret and Kitale. The first appointment of a medical officer of health to a Native Reserve took place in the latter half of the year, and has proved a complete success. Local native councils have taken an increasing interest in health matters, and large sums of money are being voted by the councils for medical and other objects. On the coast useful measures are being taken against hookworm infestation. The willing coöperation of the people holds out great promise of definite results. Throughout the Reserves generally work is being organised, so that information about diseases, and instruction in simple hygiene, is given, as well as treatment, while at the same time information about the pathological condition of the population is being collected. The country has been free from epidemics of serious disease. Plague requires watching, but no outbreaks of any magnitude occurred during 1927. Small-pox was introduced into Nairobi from India, and uneasiness was caused from the fact that cases came under notice from a considerable area, extending as far out as the Fort Hall Reserve. Original cases had remained concealed. Probably owing to the wholesale vaccination campaign conducted two years ago, the outbreak did not assume any magnitude. The epidemic of malaria experienced in 1926 did not recur, possibly owing to the fact that the rains generally were on the short side. The problem is to be tackled energetically in Nairobi; the Government made available a sum of £20,000, to be expended during 1928, the municipality and railway authorities sharing in the expense. The International Sleeping Sickness Commission, part of whose labours were conducted in Kenya, has completed its work. It was possible during 1927 to conduct a comprehensive population survey of the lake shore. Over 200,000 individuals were examined, and only 380 cases of trypanosomiasis were detected, these mostly being found in three well-defined areas. In one small location, consisting of a population of 800 odd, over 100 cases were found. Measures to deal with the most thickly infested areas are being undertaken. The small area referred to as being especially heavily infected is to be evacuated. Other steps will include clearing of the lake shore and the construction of watering-places. All cases which were found were adequately treated, in order to render them non-infective.

Progress of the scheme for the provision out of loan funds of hospitals in various parts of the country has not been as rapid as was hoped, but a small hospital at Kiltui is practically completed, while work has been commenced on a hospital and other medical buildings at Kakamega Station.

[1] Derm. Woch., June 6th, p. 810.

AN INGENIOUS TRUSS.

THE "Colquhoun" truss for hernia consists of a steel spring, to which is fitted a pneumatic appliance consisting of a back pad situated at the centre of the spring, with air connexions communicating with the front pad or pads, which cover the site of the hernia. The pads are inflated by the wearer to the extent he finds most comfortable; the valve is then closed, and the pressure in the appliance remains even. The back pad serves a double purpose: (1) it substitutes a soft air cushion for the hard spring, and (2) transfers the pressure to the front pads in conformity with the movements of the wearer. The pads are constructed to include some of the well-known product "Sorbo." While rendering them practically immune from puncture, this does not interfere with the automatic movement of the air, and makes it possible to use a much softer pad than can be employed with nearly all steel spring trusses. The softness of these pads allows them to conform readily to the contour of the body, while the action of the spring, combined with the automatic pressure exercised, gives a soft yet firm holding. This pressure, which owing to the construction of the spring occurs only directly under the pads, has a natural lifting tendency on the front pad or pads, instead of a direct inward action. Any cough or sudden movement is resisted first by the air cushion and then by the spring of the truss. Owing to the special construction, it is claimed that perineal straps are unnecessary

The principle on which this appliance is designed is distinctly ingenious, and the truss should prove comfortable to wear. It is manufactured by the Uterpress Co., 65, Atlantic-road, Brixton, London, S.W., and a patent has been applied for.

NEW WOMEN'S WARDS AT GRAVESEND.—The Marchioness of Carisbrooke last week opened new women's wards at the Gravesend and North Kent Hospital.

PRESTON ROYAL INFIRMARY.—The sum of £10,000 has been allocated to the building fund of Preston Royal Infirmary by the trustees of the estate of the late Alderman T. Parkinson, who was thrice mayor of Preston.

NORTHAMPTON GENERAL HOSPITAL.—Mrs. J. G. Sears, of Collingtree Grange, Northamptonshire, has given £5000 to the Northampton General Hospital, £3000 of which is to be allocated to the purchase of radium.

A NEW ORTHOPÆDIC HOSPITAL.—A new hospital for cripples was opened on August 3rd at Harlow Wood, near Mansfield, on a site given by the Duke of Portland. There are two wards of 40 beds each, and the total cost of building and equipment was £35,000.

NEW HOSPITAL AT BOGNOR.—It is proposed to erect at Bognor a county hospital to commemorate the King's convalescence in the neighbouring hamlet of Aldwick. A site, together with a promise of £5250, has been given by an anonymous donor, and a committee has been appointed to further the scheme.

Hunterian Lecture

ON THE

TREATMENT OF VARICOSE VEINS AND VARICOSE ULCERS BY INJECTION.

elivered before the Royal College of Surgeons of England on Feb. 8th, 1929,

BY REGINALD T. PAYNE, M.B. LOND.,

LLOW OF THE COLLEGE ; CHIEF ASSISTANT TO A SURGICAL UNIT AT ST. BARTHOLOMEW'S HOSPITAL.

IN introducing the subject of the injection treatment varicose veins and varicose ulcers, the opening ords of Mr. Warrington Haward, in his Hunterian ectures on "Phlebitis and Thrombosis," given in 06, are apposite. "It has always seemed to me that r interest in a disease should be in proportion not the rarity, but to the commonness of its occurrence." aricose diseases are common among all classes of e community; they cause untold discomfort and ffering amongst their victims, and in an insidious anner they are responsible for considerable economic ss. Moreover, modern feminine fashion tends to ake them a social stigma. It will, I think, be nceded that the operative treatment of varicose ins is far from ideal: in the majority of cases the ethod is only palliative, and there is a large group for hom surgery has had hitherto little or nothing to fer on account either of the severity of the disease the presence of complications. For these patients e crêpe bandage and the elastic stocking have en ever-present reminders of surgical failure. uring recent years operative measures have been creasingly replaced by injection treatment, and hile opponents of the latter are inclined to gard it as a return to the dark ages of surgery, s protagonists have tended to consider it a nacea for all forms of varicose disorder. In its odern conception injection treatment consists sentially in the intravenous injection of substances hich act by damaging the endothelium of the vein d so lead to a localised thrombosis. This thrombus then organised, and the vein left as a thin fibrous rd in the subcutaneous tissues. The process as a hole is frequently referred to as thrombo-sclerosis.

HISTORICAL REVIEW.

The idea of introducing chemical substances into ood-vessels with the object of producing localised rombosis is far from new. The method was first nployed in 1851 by Pravaz, the inventor of the podermic syringe, in an attempt to cure aneurysms the injection of ferric chloride solution. In the me year Desgranges and Valette and others of the ons school carried out this treatment, with a rtain measure of success, in cases of varicose veins. wo years later, in 1853, both Chassaignac and llin were using the method in Paris and showed ses at the Société de Chirurgie, but the former ported fatalities from septic complications. Broca as still using ferric chloride in 1860, and it was not l 1884 that this substance was finally abandoned the result of further fatalities recorded by einlehner. The accidents arose from two causes: stly, ferric chloride is a coagulant of blood, and condly, sepsis was only too frequently introduced the time of the injection. Pulmonary emboli, ptic thrombo-phlebitis, septicæmia, and extensive cal sloughing were the inevitable sequelæ.

In 1854 Soquet, professor of pharmacy at Lyons, troduced iodo-tannic solution, and this was employed ccessfully by Desgranges and Barrier, who in the me year reported 16 cures without accident. The rombi produced by this method were firm, but the vere pain they caused necessitated rest in bed for me time. Other substances tried at this time clude chloral hydrate and persulphate of iron. After 1876 perivenous injections became popular for varicose veins, hæmorrhoids, rectal prolapse, and varicocele, as there was considered to be less danger from septic complications than with intravenous methods. Englisch, Marc See, and Broca used alcohol injections in the treatment of varicose veins. As late as 1894 Delore was defending the iodo-tannic method, but at this period all intravenous methods were in disfavour owing to the increasing use of operative measures.

At the beginning of the present century Tavel, of Berne, obtained good results with the use of intravenous 5 per cent. phenol, but combined this with proximal ligature of the saphenous vein. Schiassi, of Bologna, in 1908, used an aqueous solution of iodine and potassium iodide injected distally, but also resected a small portion of the vein locally to prevent emboli. Borchards in 1910 discovered that intravenous salvarsan cured varicose veins and was equally successful with other arsenical preparations. In 1913 Hanschell, as a result of experience of the thrombosing action of quinine when given intravenously for malaria, employed this drug in the treatment of varicose veins with some success. At this time, however, intravenous methods on the whole were certainly not popular, they were used rather tentatively, and the general opinion was that the successes were obtained more by good fortune than by wisdom.

CURRENT METHODS.

To Prof. Linser, of Tübingen, belongs the credit of trying intravenous methods in a large number of cases. Starting in 1911, this worker has successfully used 1–2 per cent. solutions of mercury perchloride in over six thousand cases. The disadvantages of this drug are those common to all mercurial preparations, and in more recent years sodium chloride has been substituted. In 1916–17 Prof. Sicard, of Paris, observed that veins were frequently obliterated as the result of injections of intravenous luargol, and soon recognised that this was due to the free soda in the solution. In 1918 he found that neutral sodium carbonate led to thrombosis and sclerosis of veins. On account, however, of the extensive sloughing which it produced in the subcutaneous tissues, it was soon abandoned in favour of the much less toxic sodium salicylate. With this drug Prof. Sicard and his co-workers have had marked success in a large series of cases. Nobl of Vienna has confirmed Linser's results with mercury perchloride, and Genevrier in France has popularised the quinine and urethane method. Many other drugs have been tried including sodium citrate, mercury biniodide, the double hydrochlorate of quinine and urea, and glucose.

In this country experience of injection therapy is confined to four or five years, but the accumulating results support the earlier work of the continental observers. The solutions most favoured are the sodium salicylate and the quinine and urethane preparations.

THE CIRCULATION IN VARICOSE VEINS.

The question of the circulation in varicose veins is a perplexing one and I do not think it is necessary to enter into it fully, but certain aspects of recent experimental work are fundamental. The essential feature of this work is that in patients with established varices of the internal saphenous vein the blood flow in this vein is, under certain conditions at least, peripheral and directed away from the heart. Magnus, using the Volkmann hæmodrometer, has shown that, in patients with a positive Trendelenburg sign, the blood flow is distally directed in the internal saphenous vein when the limb is in the vertical position, but if the limb be raised to 45° or more the flow is either stationary or is directed towards the heart in a rather slow stream. Jentzer has comfirmed the work by radiographic methods. He found that an intravenous injection of strontium bromide into a varicose internal saphenous vein travelled distally. This work receives further support from Magnus's experiments with the skin microscope.

He has shown that in varicose conditions, with the limb at varying angles, the capillary blood flow in the skin of the lower leg is markedly increased immediately the hæmodrometer records a distal flow.

Admitting for the moment the validity of these experiments, the condition of the circulation in the varicose limb is as follows. Blood from the deeper parts of the limb passes upwards in the femoral vein, and on reaching the saphenous opening some of this pours into the valveless saphenous vein and travels distally. Theoretically, this blood may again reach the deeper veins via existing collaterals, or, on the other hand, may only do so after passing through the capillary bed once more, in a reverse direction. That at least part of the blood takes the latter course is suggested by Magnus's experiments. Under certain circumstances, therefore, the blood flow in the capillaries of the lower part of the varicose area is reversed in direction, and is composed of "used" blood. Granted these abnormal mechanical conditions in the circulation, physiological changes inevitably follow in the blood itself, and as a result of these tissue nutrition is impaired. Without accepting these views in their entirety, it is possible to admit that they provide the most logical explanation available of the development and the persistence of varicose ulceration, as well as of the conditions under which healing of this ulceration may be brought about.

Discussion of Cases Treated by Intravenous Injections.

During the past two years 230 cases of varicose veins have come under may care, the majority in the out-patient department at St. Bartholomew's Hospital. The sex incidence was 44 males and 186 females. Injection treatment has been given in 206 cases, the age limits in this group being 16 and 76 years respectively. There has been no selection, and all cases have been treated provided definite contraindications did not exist. Fully 50 per cent. of the patients would have been regarded as quite unsuitable for surgical measures, on account either of age, general condition, the extent of the varicosities, or the presence of dermatitis or ulceration.

The quinine and urethane method has been the one of choice, and of this 1525 injections were given; 150 injections of sodium salicylate were also given, but their use was confined to patients who were intolerant of quinine or in whom there existed contraindications to its use. The quinine and urethane method was chosen from the point of view of determining its efficacy and limitations, rather than from any preconceived ideas of its superiority to other drugs.

Of the total 206 cases treatment is complete in 140, while 54 are still under treatment. Twelve patients have abandoned treatment, four on account of intercurrent disease and eight without giving any reason. Treatment in all cases has been ambulatory, no serious complication necessitating the patient's admission to hospital has arisen, and there has been no mortality. Out of the 230 cases of varicose veins treated, 24, or approximately 10 per cent., were found to be unsuitable for injections on the following grounds:—

Acute phlebitis	5	Psychoneurosis	3
Phlegmasia alba dolens	8	Bilateral ankle œdema	1*
Typhoid thrombosis	3	Varicules only	1
Pregnancy	1	Acute psoriasis	1
Age (74)	1		

*Unilateral varicose veins.

The reason for the rejection of these cases will be discussed more fully later, when dealing with the contraindications to injection treatment.

Detailed case-histories were taken from all patients with special attention to symptoms, the age at onset, pregnancies and the menstrual history, the occurrence of deep or superficial phlebitis, the development of dermatitis and ulceration, and a history of cardiovascular-renal disease. In all cases where any atypical symptoms or signs were present a comple general examination was made in addition local examination.

Technique of Injections.

The quinine and urethane preparation is of t following formula:—

Quinine hydrochloride	4·0 g.
Urethane	2·0 g.
Aq. dest.	ad 30 c.cm.

The active principle causing damage to the endotheli lining of the vein is the quinine, the urethane mere raising its solubility in aqueous solution. On standin the solution slowly deposits crystals of quini hydrochloride; these can easily be redissolved warming to body temperature. The sodium salicyla solution is made up in strengths of 20 per cent., per cent., and 40 per cent.

The actual technique is similar for the two solutio The patient stands in a good light and an Esmarch tourniqu or Martin's bandage is applied proximal to the propos site of injection. The object of this is to render the vei prominent during the insertion of the needle, and in cases it should be removed before the injection is mad The patient then lies down and the region of the propos injection is carefully cleaned with ether. A 5 c.cm. reco syringe carrying a No. 17 needle is filled with the requir amount of solution and introduced obliquely throu healthy skin into the lumen of the vein. The plunger then slightly withdrawn to confirm the fact that the nee is in the lumen. At this point the tourniquet is remove allowing the vein to collapse and ensuring that the quini and urethane solution reaches the vein walls in a hi concentration. As a rule, 1 c.cm. in 15 seconds is abo the average rate of injection, but no force must be us and the time must depend to some extent on the resistan encountered. Pressure is then applied with an ether sw over the site of injection and the needle is withdraw the swab being kept in position for two minutes. T puncture is dressed with collodion on a pledglet of wo and when dry the whole is covered with a small squa of wool and firmly bandaged. The maintenance of digi pressure after injection, the collodion dressing, and t bandaging are designed to lessen the risk of leakage of blo mixed with injection material into the subcutaneous tissu around the site of puncture. Leakage is almost certa to cause local complications. The patient goes home, a returns at the end of a week for further treatment. the patient's usual activities are permitted, rest is n enjoined, but the normal reactions which follow injection a explained.

Considerable discussion has centred round t question of the position during the injection, ma workers preferring to have the patient standin This was done in some of the earlier cases b abandoned because many of the patients objecte On theoretical grounds, it might seem desira to insist on rest for 10–15 minutes after the injecti to prevent any possible aspiration of blood into t deeper veins, but this has not been carried out a no untoward effect has been noted.

Dosage.

It is advisable to commence with a small dose quinine urethane solution and for the first injecti 0·5 c.cm. is invariably employed. This has a twofo object, the first being to test the local reaction the veins to the solution, and the second to discov whether or not the patient possesses any spec idiosyncrasy towards quinine. Subsequent injectio are, in practically all cases, 2 c.cm. per dose, whi can generally be relied on to thrombose 5–6 incl of a vein. Larger doses may be necessary in a f cases, but more than 4 c.cm. should never be giv at one sitting. It is important to follow cases clos to see exactly what degree of thrombosis injectio are producing, for individual differences play a la part and injections must be regulated accordingly.

The technical details for sodium salicylate solutio are the same as for quinine, except in dosage. Inj tions should begin with 2 c.cm. of 20 per ce solutions, which will usually thrombose about 4 incl of vein. Later injections must be regulated accordi to the amount of thrombosis produced. If the 20 p

nt. solution is adequate, injections may be confined this; if inadequate the 30 per cent. or 40 per cent. lutions must be tried in doses up to 4 c.cm. until e requisite effect is obtained. It is important to ar in mind the fact that veins appear to establish remarkable tolerance towards salicylate solutions, a consequence of which they fail to thrombose. or this reason the surgeon should work as rapidly possible up to a dose and strength which produces e required effect.

Whichever solution is used I do not think it is sirable to attempt to produce more than about inches of thrombosis each time; if more is done e method is likely to cease to be strictly ambulatory, ving to the discomfort produced.

Site.

In general, treatment should be commenced in e most distal part of the limb, and each succeeding jection given proximal to its predecessor. This ables the operator to distinguish at once thrombosed om non-thrombosed veins. An exception to this le is made when the varicose condition involves e region of the ankle-joint. Veins in this position ould always be left till all others have been treated; ey are then usually found to be entirely symptomless d very much smaller in size. If, however, it is cided to inject this region, it is as well to bear in mind at boots and shoes are likely to cause considerable scomfort during the thrombosis.

Using the doses described above, injections will necessary at intervals of approximately 4–5 inches ong the course of varicose veins, and in this way e whole saphenous tract may be treated to within out 4 inches of the saphenous opening.

In the earlier cases, while the total amounts jected were the same as those now used, the dose as given at two or three sites spread over about inches of vein. This has now been given up entirely favour of the injection of the whole dose at one e. The results have been just as satisfactory and uch less discomfort is caused.

Reactions.

1. *Quinine.*—Injections should be entirely painless, art from the prick of the needle as it penetrates e skin; pain during the injection shows that the uid is finding its way into the subcutaneous tissues d is an indication for discontinuing the injection once. Thrombosis begins between 12 and 24 hours ter the injection and is accompanied by slight elling, aching, and tenderness of the vein. This in is invariably accentuated by postural changes, d is especially noticeable in the morning. As a le the thrombosed segment becomes partially herent to the overlying skin as a result of mild riphlebitis but, although this occasionally shows a ear bruising, redness is unusual. After about four ys the vein begins to shrink, and this process ntinues for at least three months. Local tenderness sappears at the end of a fortnight, but bruising may ke six weeks to clear up, and at times a slight rmanent pigmentation is left. All these reactions e more severe where the vein is situated over bony ominences which prevent its sinking back into the bcutaneous fat. Patients show marked individual riations in the degree of reaction. The subsequent scomfort is in most cases slight and rarely limits tivity. In the present series four cases lost two ys' work each, and one case one day, in consequence more than usual discomfort.

Constitutional effects due to quinine were observed 4 per cent. of the cases and included nausea and miting, tinnitus, headache, and a transient inter-enstrual loss. In women quinine injections must t be given during menstruation. No general inine reactions were seen in the male cases.

Abnormal local reactions, due to leakage of blood ixed with the quinine solution into the subcutaneous sues, are also occasionally seen. In their mildest rm these consist of blood blisters, half an inch in diameter, which dry up in about three weeks. If the local process is more severe necrosis occurs, leaving a small eschar which heals in four to six weeks. These eschars were produced in eight cases in the first 500 injections, and in three cases in the last 1000 injections. The high incidence in the former group was due to the fact that in these the punctures were dressed with collodion only, whereas in the latter group the special precautions described were adopted. It is highly important, I think, that this type of complication should be guarded against by all possible means, for it provides an entry for sepsis with all its attendant dangers. In the present series, however, no septic complication has been seen. This necrosis sometimes occurs at sites remote from the injection, through a vein which is very thin-walled at that point. In such cases the dosage has been too high. Three cases showed rather more extensive thrombosis than was intended, in that this reached from the region of the knee to the mid-thigh, a distance of 8 inches. These all occurred in veins which possessed no obvious tributaries and in which, therefore, the effects of stagnation were likely to be marked.

2. *Salicylate.*—The use of sodium salicylate solutions has in the present series been confined to cases which showed an idiosyncrasy towards quinine or in those associated with pregnancy. Salicylate invariably gives rise to considerable cramp-like pain during the actual injection, but the subsequent discomfort is usually less than with the quinine method. No local lesions have been observed, but the two solutions seem equally likely to produce these. Varicose veins rapidly develop a tolerance to sodium salicylate, and for this reason the doses and strength of the drug has to be increased as treatment proceeds. Occasionally this results in failure to achieve thrombosis even with large doses of the 40 per cent. solution. Quinine injections have never failed.

Results in Uncomplicated Cases.

I will not attempt to present the results in statistical fashion, as this is extremely difficult. Only too often varicose veins are but a part of the clinical picture, which is obscured in no small degree by other associated conditions, of which the commonest are flat feet, hallux valgus, and the various forms of arthritis. On the whole, therefore, clinical impressions appear to be more reliable. Since injection treatment gives 100 per cent. cure in cases not associated with other pathological conditions, it can, I think, be justly inferred that, in so far as the veins are concerned, similar results are obtained in cases where the picture is complicated by the presence of other diseases.

Even from a comparatively early stage of treatment patients begin to experience relief. Bandages and elastic stockings are abandoned, usually before injections are completed, although the final functional and cosmetic results are not seen until at least three months after all treatment has ceased. From the functional standpoint, patients in whom moderate activity was only possible with limbs swathed in mummy fashion can now work and play in comfort. From the cosmetic standpoint, limbs which once resembled Saxon gouty ballusters are restored to more conventional outlines. From both these standpoints, treatment appears to be equally successful in all the various types of veins. The small and early varix of the calf, the dilated and tortuous entire saphenous vein, and the advanced, diffuse, arborescent veins of the lower leg, all respond well. Injection methods are also applicable to the spidery varicules so often seen in women; these are often almost symptomless and in the present series they have only been treated when complicated by recurrent subcutaneous ruptures. Whichever type of case is considered, one of the most striking features of treatment is the remarkable recovery of tone and elasticity of the thinned and atrophic skin after obliteration of the veins.

All cases should be kept under observation for at least a year after treatment has finished.

In the present series no case has shown re-canalisation of a thrombosed vein when the varicosity was confined to a single main vessel where this could easily be recognised. In the type of case where the entire calf is an entangled mass of interlacing veins, prolonged observation is, however, especially necessary, for reactionary changes in the thrombosed veins often hide smaller veins which are still patent. Injection treatment offers no guarantee against the development of varicosities in other veins, but it does provide a simple means of dealing with these at an early stage should they arise.

Results in Ulcer Cases.

If trauma or infection should be superimposed upon an inefficient skin circulation, a particularly chronic type of ulceration is bound to ensue. In general, persistence of ulceration on the surface of the body is due either to chronic infection or to circulatory conditions so inadequate that repair processes cannot be carried on. The results of injection treatment show that the vascular instability is undoubtedly often responsible for the chronicity of the lesions, and that infection plays a secondary rôle. Varicose ulceration has in the past been cured by rest in bed, by the various forms of Unna's bandaging, and by surgical treatment of the veins; it is now curable by injection methods. The common factor underlying all these measures is the relief of venous congestion, temporarily, by rest and bandaging and permanently by operation or injection.

The present series of cases consist entirely of out-patients at St. Bartholomew's Hospital, and the way in which such patients dress their ulcers at home inevitably leaves much to be desired. In all these cases treatment has been strictly ambulatory rest has not been enjoined and patients have been allowed to proceed with their usual occupations. The only local treatment to the ulcers has been the application on alternate days of the calamine lotion of the St. Bartholomew's Hospital pharmacopœia, after washing the ulcer with boiled water. At each weekly visit to hospital the ulcer has been carefully cleaned with ether to remove all adherent debris, particularly at the edge.

Before commencing injections it is best, in cases where the skin around the ulcer is in a very unhealthy state, to carry out this treatment for two or three weeks. Injections should never be made through the unhealthy skin which so often surrounds the ulcers. Coming into contact with the ulcer above will be found, in almost all cases, a large radicle of the internal saphenous vein. This vessel has been referred to as "a stagnating, stinking sewer, inundating an adjacent field and rendering it barren." Palpation in these cases is a much surer guide than inspection, and it is to this key-vein that particular attention must be directed.

The Table gives the results that have been obtained in ulcer cases.

The total number of cases with complete thrombosis in one or both limbs is 29. In the thrombosed limbs 63 ulcers were originally present, and of these 55, or 87 per cent., have healed under injection treatment. In cases 10 and 112, ulceration had been in progress 23 and 18 years respectively. The majority of the remainder show a marked diminution in size under treatment.

From the point of view of injection therapy, ulcers fall into four categories. 1. Small ulcers up to 2½ inches in diameter with edges which are well-defined, and showing only a moderate amount of disturbance in the surrounding skin. Periostitis, as shown by X ray, is either absent or very slight. These ulcers heal readily with injection treatment. 2. Ulcers similar to the above, but showing induration and inflammation of the surrounding skin, and X ray evidence of marked local periostitis. These ulcers heal slowly with injection treatment. 3. Large, irregular, deeply excavated ulcers, with advanced fibrosis and induration of the adjacent tissues; X rays show considerable diffuse periostitis. These ulcers show little or no improvement with injectio treatment. It is in this group that operative measur and physical treatment will be required aft thrombosis of the veins is complete. 4. Ulce occurring in limbs which are the site of an old dee thrombosis. In this group injection treatment strongly contraindicated.

Varicose Ulcer Cases Treated by Injections.

Case.	Ulcer diameter in inches.	Duration in years.	Thrombosis.	Present condition (size in inches).	Case.	Ulcer diameter in inches.	Duration in years.	Thrombosis.	Present condition (size
6	6	15	C	4×5		2	16 R.	C	1
10	2½*	23	C	H.		2	16 R.	C	¼
	2½†	23	I	¼			1 m.		
12	2	3 m.	C	H.	82	¾	,,	C	H.
14	1*	1	A	?		¾	,,	C	,,
16	1	5	C	H.		1	,,	C	,,
	1	5	C	,,		1	,,	C	,,
	2	5	C	,,		1	,,	C	,,
	2½	5	C	1		1	,,	C	,,
	3	5	C	1½		1½	,,	C	,,
18	1	3 m.	C	H.		1½	,,	C	,,
22	1½*	1	C	¼	86.	1×¾	3	C	,,
	¾†	3	C	H.	91	1×¼*	2 m.	C	,,
24	2	40 R.	C	,,		¾×⅜	,,	C	¼×
26	1	2	C	,,		½×¼†	,,	I	¼
	2	2	C	,,	93	½	3 m.	C	H.
	2½	2	C	1×½		¾	,,	C	,,
	3	2	C	1×1		¾	,,	C	,,
33	1*	2	C	H.		¾	,,	C	,,
	1†	2	C	,,		¾	,,	C	,,
35	¾	2	I	¼	104	1	7 m.	C	,,
38	1	8 m.	C	H.	108	1½	6 m.	C	,,
39	6×11	10 R.	A	?	112	2½×1½	18	C	,,
42	1½	1½	I	½	121	2×1½	8 R.	I	1×
44	2×1	1 m.	I	2×1	123	½*	6 R.	I	¼
46	1¼×⅛	10	I	¾×⅜		1†	6 R.	C	H.
49	2½	1	I	¾	141	1½×1	10 m.	C	,,
51	¾×½	6 m.	C	H.	146	2½×¾	10	I	1¼×
52	¼*	1 m.	C	,,		2½×¾	10	I	1×
	1×¾†	2	C	,,	147	½×½	10 m.	C	H.
54	2½×1′	25 R.	C	,,		⅝×½	,,	C	,,
	1¼×1	25 R.	C	,,	164	1¼×1¼	2	C	,,
56	2½×2½	4	C	,,		1×1	2	C	,,
	1×1	4	C	,,	182	1½	3	I	¾×
58	1½×1	3	C	,,	183	⅜	14 R.	C	¼×
	½×½	3	C	,,	199	½	2 m.	I	¼
61	¾	2	C	,,	201	1×¾*	13	I	1×
	¾	2	C	,,		¾×⅜†	10	I	¼×
	¾	2	C	¼	203	2×1	2½	I	H
	¼	2	C	¼		1×¾	2½	I	¼×
68	2½	16 R.	C	H.	206	2×3	2½	I	2×
	1	16 R.	C	,,	208	2½×1	3 m.	I	2½
	1	16 R.	C	,,					

* Right; † Left; M=months; R=recurrent; C=Complet thrombosis of varicose veins; I=Incomplete thrombosis varicose veins; A=abandoned; H=healed.

Prognosis is best based on skiagraphic findin The more the underlying bone is involved the m slowly will healing occur. As a general rule ve large ulcers are especially associated with de thrombrosis, severe periostitis or syphilis, and th conditions should not be overlooked.

The results in this series of cases show what c be expected of injection treatment combined w a minimum amount of local interference. Or veins are thrombosed, ulcers with but slight bo involvement should be treated as healing woun the dressing of which will always be a matter individual preference. In the past, however, t variety of so-called specific applications in the tre ment of varicose ulceration has been based more the eternity of human hope than on sound patl logical principles.

Histology.

Into the problems connected with the physiolo of blood clotting and thrombosis I do not prop to enter, but some consideration of the histolo of the process is necessary in order to gain a corr impression of intravenous changes following inject treatment. Absolute integrity of the venous en thelium is essential if the fluidity of the circulat

od is to be maintained. Any lesion of intima, it chemical, physical, mechanical, or bacterial, l lead to a secondary thrombosis in the damaged a. All that injection does is to produce localised lothelial damage by means of drugs which act her by physical or chemical properties. The actual e is brought about by physiological changes ich occur as a result of this damage. Many observers ve made histological studies of veins, both in n and in animals, at varying intervals after the roduction of sclerosing substances. Jentzer, ng a solution of sodium salicylate with collargol, s demonstrated these changes, the latter drug ng added to show the limits reached in the vein ll by the solution. Whereas the greatest change urs in the intima, there are concomitant changes the media and even in the adventitia. These periments were carried out both in man and animals. is work has been confirmed by Benet and Verne ng sodium salicylate solutions on rabbits. Wolff s carried out similar experiments on dogs, using rrosive sublimate, and Hanschell has observed the tological changes in man after quinine injections.

Summarising the results of these workers, the ocess may be described as follows. The earliest ange occurs in the endothelium and consists in a elling of the cells; soon these begin to proliferate wards the lumen of the vessel, become more globular shape and resemble primitive mesenchyme cells. n this very irregular surface blood platelets are posited; and around these there forms a very herent thrombus composed of fibrin, red blood cells d a few white blood cells. On about the fourth day ganisation of the thrombus commences by the vasion of the proliferated endothelial cells. Similarly, a very early stage, hæmorrhages occur in the media, e muscle cells lose their rounded appearance, and ere is a round-cell infiltration. At about the end a week the distinction between thrombus and vein ll is beginning to be lost, and the process of fibrosis ntinues slowly, till, at the end of about three nths, the vein is represented by a thin fibrous cord. ie gross specimens also show that from the earliest ages the thrombus is densely adherent to the vessel ll. It is undoubtedly to these histological changes at we must turn when we seek to explain the rarity pulmonary embolus as a sequel of injection atment.

Pulmonary Emboli.

A method of treatment which relies on the formation an intravenous thrombus, during the development which the patient is allowed to continue his normal ivities, must supply an answer to the very pertinent estion as to the risk of pulmonary embolus from migration of the clot. That answer can, I think, given. Taking major surgical operations as a ole, pulmonary embolus is responsible for one death approximately every thousand cases. Most writers agreed that this risk is considerably increased in erations on varicose veins, but very few large series ve been published to demonstrate this. In two ups of cases quoted by Goerlich and Jeannel pectively, of 1591 operations on varicose veins, e deaths from pulmonary embolus were recorded, ing an incidence of about 1 in 300. In discussing risks of injection treatment these figures should borne in mind. In a recent paper McPheeters and e have analysed the fatalities following injection atment. A total of 53,000 treated cases has been orded in the literature, with only ten fatalities these, seven were directly attributed to the ection. The causes of death were: three from n-infected pulmonary embolus, one from pulmonary bolus associated with thrombophlebitis, and one h from septicæmia, mercury poisoning, and ombophlebitis. There were three other deaths from lmonary embolus, but these occurred in patients o had some other condition which might equally ll have accounted for the embolus. Taking the al fatalities from all causes, including sepsis, this es an incidence of 1 in 5300 cases. Linser quotes 6000 cases, Nobl 2960 cases, and Sicard and Gaugier "many thousand cases," all without fatality.

These figures speak for themselves. They show at least that, as far as practical results go, the risk to life of injection treatment is very much less than the risks associated with operative measures. All forms of intravenous therapy have their inherent risks, and to this rule the injection treatment of varicose veins is not an exception, but in practice these risks have been shown to be slight.

Contra-indications.

The contraindications may be summarised thus:—

1. *Deep thrombosis.*—In cases in which thrombosis of the deep veins of the limb has been followed by a compensatory dilatation of the superficial ones, injections should not be given, for any interference with the latter veins will certainly further impede a circulation which is already doing its best to carry on. In practice the commonest condition of this type is phlegmasia alba dolens, and a rule should be made that in patients with a definite history of this condition varicose veins should never be injected, no matter how far the limb has recovered from its previous œdematous state. In this group typhoid thrombosis will also provide a small number of cases.

2. *Acute phlebitis.*—Veins should never be injected in patients with acute phlebitis, and in practice no cases of this type have been treated until an interval of at least six months has elapsed since the attack has subsided. Acute phlebitis is in many cases probably a low-grade infection, and to stimulate further thrombus formation at this time is an invitation to septic complications. Disregard of this rule has been responsible for some of the reported cases of septic thrombophlebitis with embolus formation.

3. *Intra-abdominal tumours.*—In all cases the primary condition must be treated before considering treatment of the veins.

4. *Cardiovascular disease.*—There does not appear to be any real objection to treating these cases provided compensation is adequate. The present series includes two cases of mitral stenosis treated successfully.

5. *Skin disease.*—The presence of some active skin disease will in a few cases contraindicate injections.

6. *Pregnancy.*—As a general rule injection treatment should not be given during pregnancy. After this is over the veins usually show marked improvement and the injections should then be given. In patients in whom veins are giving rise to severe discomfort during pregnancy treatment is, however, justified. The quinine method must, of course, not be employed, but good results can be obtained with salicylate solutions.

Conclusions.

Injection treatment is a much safer procedure than operation; the method is one which is applicable to a much wider group of cases; the technique is simple, but perhaps this very simplicity is an invitation to abuses; the treatment is ambulatory, and the results good both from the functional and from the cosmetic standpoints; the method is of great prophylactic value against varicose ulceration, and even when this is present healing can be promoted in the majority of cases. It is too early to be dogmatic about recurrences but, if they should occur, injection provides a ready means of dealing with them. For these reasons I submit that injection therapy represents a distinct advance on operative methods in the treatment of varicose veins and varicose ulcers.

In conclusion I will quote the words of our President in connexion with this subject: "In surgery the search is always for simplicity. Complicated and cumbersome methods which are inherently dangerous give way by degrees to simpler and safer procedures. In surgery, as in the other arts, the easy way is often the outcome of long experience and of trial and error."

AN EXAMINATION OF THE PATHOLOGICAL EFFECTS OF STREPTOCOCCAL TOXIN AND HÆMOLYSIN ON RABBITS,

WITH SPECIAL REFERENCE TO THE ÆTIOLOGY OF PURPURA FULMINANS.

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During the past three years I have had occasion to observe in some 250 rabbits the effects of administering streptococcal toxins and hæmolysins intravenously in fatal and sublethal doses. In the following paper an account of the clinical signs and pathological changes is offered.

The extensive literature on streptococcal toxins is concerned chiefly with the effect of intradermal injection into man. Effects ascribed to its action on other tissues, either in man or in animals, are often complicated by the fact that either living organisms or hæmolysin were also present or both. Such effects as nephritis or arthritis by toxic absorption in man are at present merely hypothetical.

Observations of Previous Workers.

It is necessary to read far back into the literature to find records of pure toxic effects on animals. The most interesting paper, which unfortunately I did not find until this work was concluded, is that of Laitinen,[1] who in 1896 precipitated cultures of a streptococcus with ammonium sulphate or amyl alcohol, or both, and injected the redissolved product into rabbits. He described hæmorrhages in pleura, pericardium, kidneys, peritoneum, and diaphragm, but published no histological details. He produced paralysis by direct injection into nerves, and claimed to be the first to have concentrated the toxin.

Roger, in 1892,[2] precipitated the toxin with alcohol, and found gross diarrhœa, convulsions, and death within four days in rabbits. He was able to immunise rabbits, but only with heated toxin. Many other authors, at or about this period, succedeed in killing rabbits with toxin. Their methods are sometimes subject to criticism—as, for instance, where three-months' old cultures in richly albuminous fluids were used. Perhaps the fact that these early workers did not have available protective antisera has distracted attention from their work. More recently, Stoddard and Woods[3] and Duval and Hibbard[4] have studied the nephritis produced in rabbits by the toxin. Parish and Okell [5] have used unconcentrated toxin, and protected rabbits against death with antitoxin.

Duval and Hibbard produced a glomerulo-nephritis in rabbits by a special technique. They first immunised rabbits with scarlet fever strains other than that of Dochez; later they injected living streptococci of the same strains into the peritoneum. The rabbits were killed after some hours' delay, and the peritoneal exudate, devoid of organisms, killed other rabbits on intravenous injection of 5 c.cm. Apart from the nephritis, no lesions were found, and the markedly glomerular nature of the lesions is not in conformity with my findings.

These authors failed to kill rabbits with living organisms of the types used. This is not in conformity with the work of Okell and Parish, frequently confirmed by me, on the ease, amounting to certainty, with which rabbits can be so killed, using the Dochez strain. They also failed to kill them with large doses of filtrates of cultures grown for 14 days. I have frequently found doses of from 2·5 c.cm. to 5 c.cm. fatal when 72-hour cultures of "Dochez" were used. But when strains of streptococcus, media, duration of culture, and breed of rabbits all vary, comparison is difficult. Apparently the injections were not controlled by antitoxin, and the effects were not necessarily due to the toxin as ordinarily understood.

This paper is important, as the authors base on their results the theory that the toxin is an "endotoxin," due to autolysis, or lysis by the immune rabbit, of streptococci. The evidence for this is at present inadequate. I have frequently found that filtrates of cultures do not kill in doses of 2·5 c.cm., but when concentrated to one-tenth the volume solutions have killed in doses of 0·1 or 0·25 c.cm. This may be due to extraction by alcohol of some toxin from the organism, which is then precipitated by the absolu alcohol.

Gray,[6] in a valuable and well-documented paper, produc nephritis in rabbits and in rats by using large doses scarlet fever streptococcal filtrates. He found the chang to be chiefly glomerular; one of his published photograp is almost identical with Fig. 7. He stressed the absence interstitial change or round-cell infiltration, and also t impossibility of giving chronic lesions.

Hartley[7] has precipitated toxin with acetic acid aft dialysis. According to Besson,[8] Bonome and Bombicci al used acetic acid, after treatment of cultures with sodiu hydroxide; I have been unable to confirm the referen which, however, has been widely quoted on Besson authority. Hartley used this concentrated toxin to estima the strength of antitoxic sera. Simultaneously, I publishe a method of concentrating the toxin by ice-cold absolu alcohol; this toxin was also used to estimate the streng of antitoxic sera.

Thus for over 30 years it has been known tha lethal effects can be produced on rabbits by concer trated streptococcal toxins; and my method a least is not new. It is, moreover, well known in th concentration of other toxins.

The Present Investigation.

The experiments summarised above are in som cases open to criticism. Where large volumes, u to 30 c.cm. of fluid are injected, the possibility non-specific results arises. Where antitoxin contro are not used there is no proof of toxic action. Whe early cultures are used, or cultures in serum brot the action of hæmolysin is not excluded.

In the experiments I am about to record the volum injected rarely exceeded 2 c.cm. Controls we invariably used; a standard control was 1·0 c.cm of intravenous antitoxic serum, administered jus before injection. No control ever died. Hæmolysi was always absent—a point which is elaborated belo In order to avoid elaborate protocols it may be state that no statement is made which was not confirme on at least four rabbits, that in most a considerabl larger number was used, and that over 150 rabbi were killed by intravenous injection.

The technique used may be given in full.

The medium used has been 2 per cent. peptone beef brot brought to a pH of 7·6 before sterilisation (about pH 7 after sterilisation). The streptococcus (the scarlet fev strain "Dochez") is grown on a simple agar slope f 24 hours, and the whole slope culture, washed off wi saline, is inoculated into 500 c.cm. of the medium in a li flask. After 72 hours, 20 c.cm. are taken, cooled in refrigerator, and then precipitated in 100 c.cm. ice-c absolute ethyl alcohol. It is left standing for 12 ho at 0° C. Most of the precipitate adheres to the sides of t flask. The supernatant fluid is centrifugalised, and t whole deposit in 2 c.cm. of normal saline, with 0·25 per ce phenol, is dissolved at 37° for 45 minutes, and frequen shaken. It is then filtered through a Seitz filter, and dilut 1 in 20,000, 1 in 50,000, and 1 in 100,000. 0·2 c.cm. these dilutions is then injected intradermally into a Di positive person (R. J. V. P.). If a strongly positive reacti does not take place at 1 in 50,000, the culture is discarde such preparations have been found useless on anim If a good reaction is produced, the bulk of the culture precipitated similarly, but redissolved in saline with phenol.

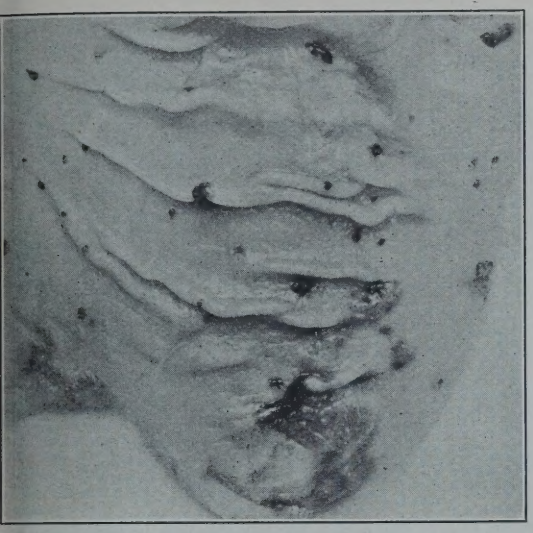
Many batches of toxin fail to yield a sufficiently high tit While the richness of the growth is no guide to the titre the toxin, I find that too alkaline or acid a reaction unsuitable for toxin production. It is essential to us human skin injection as a test of any batch of toxin, otherw many animals may be wasted. The toxin can be dr in vacuo over sulphuric acid, and then preserves its potency for at least six weeks.

In the course of these experiments, it was found t three successive batches of toxin prepared as above fa to give any skin reaction on the Dick-positive subject, failed to produce any symptoms in rabbits. On plating the culture on to blood agar, it was found that the organ was now of α-hæmolytic and *viridans* type. It has preser these characteristics on subculture. The obvious criticis that the strain had got mixed, or that the strain was origin mixed, cannot be refuted. But the recent work of Grinn indicates that, when single-cell strains of scarlet fe streptococci are used, mutation from β- to α-hæmolysi found, and that this change is associated with diminis virulence to mice. Reference to this change is also made Todd[11] and Frobisher and Denny.[12] The change in

in occurred when the stock organism had been allowed grow eight days without subculture. A fresh strain from Lister Institute was found to give good toxin, and to of β-hæmolytic type.

ince the publication of my paper,[9] I have had to amplify correct it in certain respects. In the first place, I nerly stated that 3-day cultures were the best for toxin duction. Further experiments show that, while 24-hour

FIG. 1.



stric hæmorrhages; death in 48 hours following intravenous injection of 0·25 c.cm. of toxin.

tures contain no rabbit-killing toxin, 72-hour and 14-day tures contain apparently equal amounts, if the same tch of medium and the same innoculum is used roughout. Furthermore, I have found the titre of toxin, th when estimated by skin tests and by rabbit-killing ect, to vary enormously in different batches of media, wn under apparently identical conditions.

have throughout used male chinchilla rabbits, of two unds weight. On intravenous injection I find so small a e as 0·1 c.cm. to be occasionally fatal. A dose of 0·5 c.cm. however, the most probable minimal lethal dose, and in t I use 1 or 2 c.cm. when the object aimed at is the death the animal—e.g., when it is required to study the same in by intraperitoneal injection. This preparation tains no hæmolysin, which is not precipitated by absolute ohol; neither the addition of fresh serum to the issolved precipitate nor its oxidation or reduction ders it hæmolytic. The precipitate has been redissolved 37° C. and at room temperature, but remains non-molytic. It has been put up at pH ranges from 8 to 6 hout showing power of hæmolysis. I underline this point, in using simple filtrates of streptococci, hæmolysin will injected in many cases as well as toxin, though frequently will not pass through a filter. And whatever may be the e with other organisms, streptococcal toxin and hæmolysin quite different substances, with quite separate actions the rabbit's tissues.

n studying hæmolysin, 6-hour serum broth cultures of same organism were centrifugalised and the clear ernatant fluid was examined for hæmolysin. Hæmolysis a dilution of 1 in 80, using 0·5 per cent. sheeps' cells, was epted as a sufficient strength. The animals used had all n immunised by several small doses of toxin. Thus the cts of hæmolysin were studied, without the complication toxic effects.

Clinical Effects of Streptococcal Toxin.

1. *On Intravenous Injection.*—The animal remains ll for an hour after injection. It then becomes tless and stops eating. Diarrhœa sets in after the ond hour and remains a marked symptom till uth. Breathing becomes laboured and noisy; the es are closed and water profusely at times. Death urs, as a rule, after a lapse of between 6 and 24 rs. Animals dying early often die in convulsions; se dying late have shown paralysis of limbs, intense junctivitis, great wasting, and continued diarrhœa. death has occurred after a lapse of five days. No animal eats between the time of the onset of symptoms and death; if an animal begins eating it survives.

Between breeds of rabbits there is a great variability of sensibility to toxin, and in any one breed there is a definite individual variability to the toxin precipitated by absolute alcohol. If small doses of toxin are administered at 48-hour intervals it is possible to kill rabbits by a cumulative effect. If a rabbit recovers from one dose of toxin and is subsequently given another after a lapse of seven days, a very high degree of immunity has been acquired. As much as 15 c.cm. has been given to an immune rabbit without causing symptoms of any sort, though the same toxin was lethal to other rabbits at a dose of 0·5 c.cm. I have never succeeded in producing fresh symptoms in a rabbit which has been allowed to recover from one injection for seven days. Such rabbits have been used for the hæmolysin experiments described below.

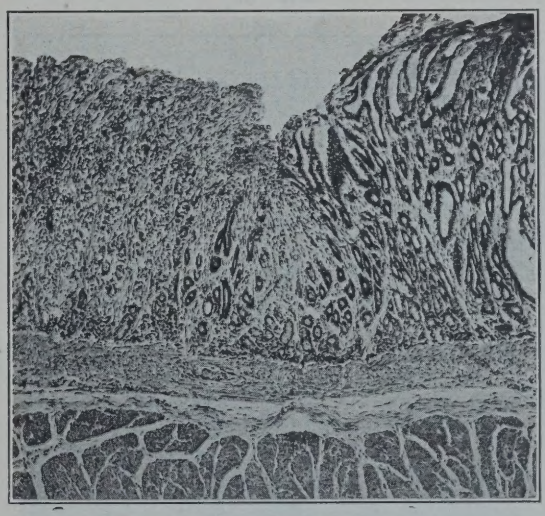
2. On *Intramuscular Injection.*—Small doses produce no effect. Ten times the dose necessary to kill by intravenous injection are required to produce symptoms by intramuscular injection. The symptoms are then similar to those found on intravenous injection, but up to the present no animals have died.

3. On *Administration by Stomach-tube.*—Of six rabbits given, by this route, from 10 to 100 times the dose fatal to other rabbits by intravenous injection, five showed no signs, and one was very ill immediately after administration and died in a few hours. No post-mortem changes were noted, and death was attributed to damage in manipulation.*

4. On *Intradermal* and *subcutaneous injection* of small doses no signs follow.

5. *Intraperitoneal injection* is fatal, but requires large doses. The changes are identical with those

FIG. 2.



Pyloric end of stomach; epithelial necrosis; ulcer; death in 24 hours following intravenous injection of 1 c.cm. of toxin. (× 100.)

following intravenous injection, but the peritoneum is very much more congested.

6. *Administration directly into large or small intestine* has not yet been studied; experiments on this point are now in progress.

Blood Changes.

On intravenous injection there is great leucocytosis, but as this also occurs when antitoxic serum is given as a control it cannot be called specific. Four hours after intramuscular injection a marked polymorphonuclear leucocytosis is found, which is absent in immune rabbits. A count of 4000 cells, with 80 per cent. lymphocytes, has been converted into a count of

* Dietrich[13] has found tetanus toxin innocuous to mice when administered by mouth, save when bile is added.

25,000, with 75 per cent. polymorphs. This is in conformity with the results obtained by Holmes [14] and Ledingham [15] with diphtheria toxin. Blood-urea has not been found to rise; in fact there is usually a slight fall.

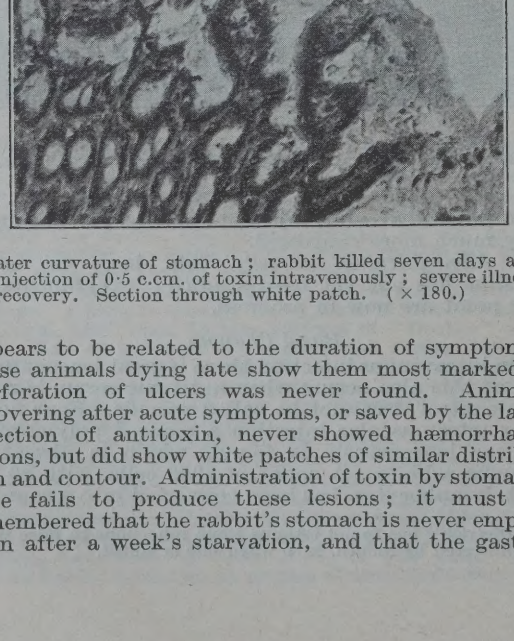
Post-mortem Changes.

1. On *intramuscular injection*, the animal being killed 24–48 hours later. No local changes, apart from needle trauma, are found in the muscles. Renal changes, slight in degree, but similar in nature to those described below, are found. No other changes were noted.

2. On *Intravenous Injection.*—In female rabbits the intense congestion of mammary vessels, first found by Hartley (loc. cit.) in his experiments on concentrated streptococcal toxin, has since been noted by me. The whole peritoneum is congested, especially that of the uteri. Subserous hæmorrhage has sometimes been noted, especially in the colon and cæcum. The bladder is usually full of urine, which does not contain blood, but does contain epithelial casts. The liver is normal; the spleen is of normal size, but is frequently very soft. The suprarenal glands are normal. The whole colon and cæcum are full of liquid fæces and of flatus. There is no macroscopic blood. The small intestine is normal, save that the Peyer's patches appear congested.

The stomach, in about 75 per cent. of the cases, shows hæmorrhagic lesions, widely distributed over the greater curvature, especially at the cardiac end. These are raised blebs, covered with epithelium, and staining the food in contact with them. Sometimes large confluent hæmorrhagic erosions are found In the pylorus depressed serpiginous lesions, which are shallow acute ulcers, are rarely found. The presence of these gastric lesions is independent of dosage, but

FIG. 3.

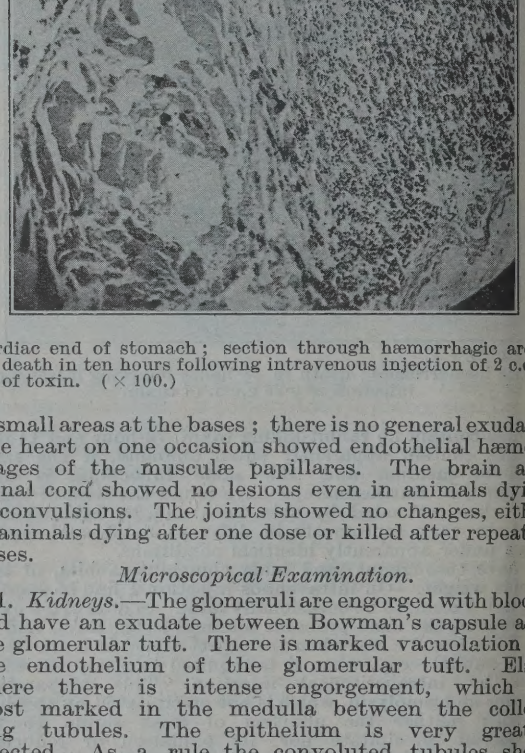


Greater curvature of stomach; rabbit killed seven days after injection of 0·5 c.cm. of toxin intravenously; severe illness; recovery. Section through white patch. (× 180.)

appears to be related to the duration of symptoms; those animals dying late show them most markedly. Perforation of ulcers was never found. Animals recovering after acute symptoms, or saved by the later injection of antitoxin, never showed hæmorrhagic lesions, but did show white patches of similar distribution and contour. Administration of toxin by stomach-tube fails to produce these lesions; it must be remembered that the rabbit's stomach is never empty, even after a week's starvation, and that the gastric ferments might well destroy toxin. The administra tion of sodium bicarbonate by stomach-tube befor intravenous injection of toxin does not prevent thes lesions.

The kidneys are of deep plum colour, especially i the medulla and cortico-medullary junction. Th right kidney is invariably more affected than the lef The lungs sometimes show hæmorrhagic consolidatio

FIG. 4.



Cardiac end of stomach; section through hæmorrhagic area death in ten hours following intravenous injection of 2 c.cm of toxin. (× 100.)

of small areas at the bases; there is no general exudat The heart on one occasion showed endothelial hæmo rhages of the musculæ papillares. The brain an spinal cord showed no lesions even in animals dyin of convulsions. The joints showed no changes, eithe in animals dying after one dose or killed after repeate doses.

Microscopical Examination.

1. *Kidneys.*—The glomeruli are engorged with bloo and have an exudate between Bowman's capsule an the glomerular tuft. There is marked vacuolation the endothelium of the glomerular tuft. Els where there is intense engorgement, which most marked in the medulla between the colle ting tubules. The epithelium is very great affected. As a rule the convoluted tubules sho the greatest change; there are marked degenerati changes, the nuclei do not stain, and the cell wal are broken down. In cases where death has bee caused by repeated small doses at intervals of fo days there are areas of complete necrosis in t convoluted tubules. The collecting tubules sho casts and a serous exudate; as a rule they preser their staining properties very well, and the epitheli casts found in them are apparently derived from t convoluted tubules. On several occasions, howeve the collecting tubules have shared in the widespre epithelial necrosis, and the epithelium is found to ha desquamated. Epithelial casts are found in the uri taken after death from the bladder. I have not fou any indications pointing with certainty to interstit infiltration with leucocytes or interstitial fibrosi but nearly all my rabbits have died within seven da of injection.

2. *Stomach.*—Lesions are confined to muco There is necrosis of the epithelial cells only; the fibro trabeculæ are unaffected. The depressed pylo lesions and the raised cardiac lesions differ only the presence of hæmorrhage in the latter. Su hæmorrhage is either a slight capillary leak or a lar clot lifting the overlying epithelium, but confined the mucosa. The margin of the lesions is sharp defined. Large Gram-positive bacilli were pointed c to me by Prof. Dudgeon in these lesions. The wh

patches in the mucosa previously referred to in a rabbit ill for seven days are seen to be due to a superficial necrosis of the epithelium without hæmorrhage.

Experiments on Other Animals.

1. *Man.*—Reference has been made to the work of Hartley, whose advice at certain stages of my experiments I gratefully acknowledge. He finds, by his

FIG. 5.

Kidney; collecting tubules. Normal epithelium; casts in lumen of tubules. Death in six hours following intravenous injection of 2 c.cm. of toxin. (× 180.)

method, that the skin-test substance is concentrated to the same extent as the rabbit-killing substance, and argues that they are probably identical. O'Brien [16] confirms these statements, and suggests that the method will prove of great value in the estimation of antitoxin. On imitating Hartley's method on the toxin precipitated by alcohol I find the same results, with the proviso that the end-point both of skin-test and of rabbit-killing substance, owing to individual variation of susceptibility, is difficult to determine. In one Dick-positive person a hot bath was found to convert a negative to a positive skin-test. Very elaborate experiments would be necessary to determine identity, on which doubt has been thrown by Dochez,[17] Jacquepée,[18] Ciuca, Balteanu and Toma,[19] and Cooke,[20] among others. In solution the rabbit-killing substance appears to deteriorate with time, and on heating; this fact might be correlated advantageously with skin-test changes. Two forms of precipitate are found in the solution, when kept: (1) a crystalline deposit, which appears to be phosphatic; (2) an insoluble amorphous precipitate. Injection of both into animals is innocuous, and deterioration of toxin is not necessarily due to their appearance.

Dudgeon and Hope-Simpson[21] found that *Staphylococcus aureus* precipitin antigens, when put up against homologous antisera, gave precipitins of two types, one of which was granular and crystalline, and the other flocculent and amorphous. It is possible that failure to obtain specific results in the precipitin experiments alluded to below was due to the spontaneous appearance in this preparation of a precipitate, which normally only occurred on admixture of specific antisera.

I find, using strains of streptococci isolated by me from human infections, that the fact that a strain will yield a skin-test filtrate does not imply that, when concentrated by alcohol, symptoms can be produced in a rabbit. But this may merely be a matter of the amount of toxin produced. Apart from the skin-test proper, experiments have been performed: (1) By dropping toxin on to the skin of the arm without breaking the surface, which has no effect. (2) By dropping the toxin into the conjunctival sac. This was three times performed, unintentionally, on a Dick-positive person. It is followed within an hour by intense conjunctivitis, blurred vision, and malaise, lasting for 48 hours. (3) Toxin on the human tongue produces a slight burning sensation.

2. *Guinea-pigs* were repeatedly given up to 100 times the dose fatal to an individual rabbit, both intravenously and intramuscularly. No clinical signs followed, and when killed no changes were found.

3. *Mice* can be killed by toxin, but they are immune, relatively to the rabbit, and require large doses, which give irregular results.

4. *Cat.*—Two cats were injected intravenously with 4 c.cm. of a toxin lethal to rabbits in a dose of 0·5 c.cm.; one was given in addition 1 c.cm. of antitoxin and remained well, showing no lesions when killed. The other, when killed after four days severe illness, showed the renal lesions illustrated in Fig. 8.

5. *Dog.*—No effect save vomiting followed the intravenous injection of 14 c.cm. of the same toxin as was used for the cat, and when killed there were no lesions.

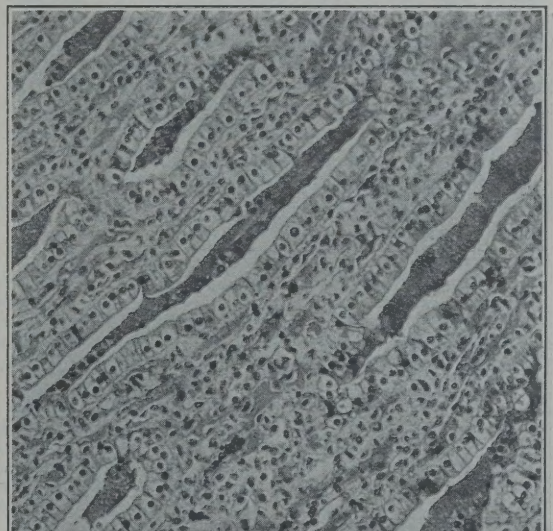
Precipitin Experiments.

Reference may be made to an attempt to estimate antitoxin by precipitin tests. The concentrated toxin gives a precipitate on dilute antitoxin, and dilute toxin on concentrated antitoxin. This is non-specific, and is also given by antisera to tetanus and diphtheria, and by normal horse serum, both when no antiseptic is added and when 0·1 per cent. formalin or 0·25 per cent. phenol is added (see Eagles[22]).

Discussion.

Too much importance should not be attributed to negative findings in this series. Since death occurs in a space of a few hours in most cases, it outpaces all save the most fulminating human infections. These experiments bear no comparison with what

FIG. 6.



Kidney; collecting tubules; normal epithelium; exudate in lumen. Death in 24 hours following intravenous injection of 1 c.cm. of toxin.

might occur when toxin is made and absorbed from a relatively small acute or chronic focus. In order to imitate that the method most likely to be attended with success would be to give intramuscular injections at short intervals, as by this route the toxin makes the animal ill, and keeps it ill for several days, but does not kill it. Such experiments are now being carried out.

Therefore, although only one case showed cardiac lesions none showed evidence of arthritic or chronic renal changes, none showed evidence of iritis, and very

few involvement of the central nervous system; these experiments as yet have no bearing on the question of chronic focal lesions and their metastatic result. Similarly, the experiments indicate that streptococcal toxin, if swallowed, is innocuous; they do not indicate what might happen if manufactured in other parts of the gut.

The positive results may be considered in order:—

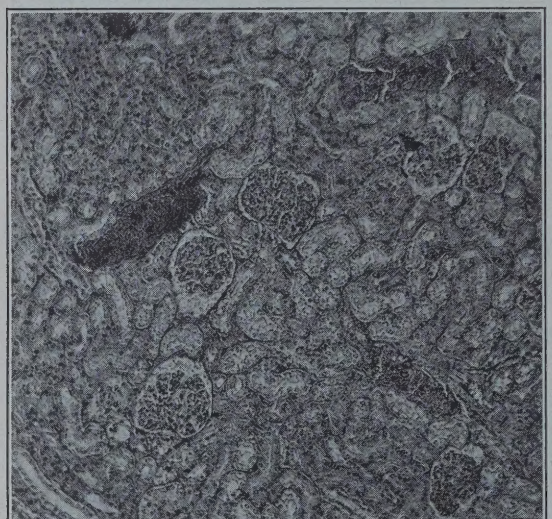
Renal Lesions.—These are not typical of scarlatinal nephritis. There is no interstitial change, even in animals surviving after severe symptoms. Glomeruli are relatively little affected. In fact, the greatest change is the intense engorgement of vessels, even to the extent of widespread hæmorrhage. While much of the parenchymatous degeneration may be secondary to this there is evidence that the proximal portions of the tubular system are specifically injured. The absence of a rise in blood-urea is probably to be neglected, in view of the early deaths. It is surprising that blood is absent from the urine.

The literature on nephritis due to experimental injection of bacterial toxins has been collected by MacNider,[23] and the specific effect on the convoluted tubules is shown to be common to many different toxins.

Gastric Lesions.—Perhaps none of the conditions in which clinical inspiration has postulated focal sepsis as causa causans has been more stressed than gastric ulcer. It is a uniform practice to remove faulty teeth in this condition. Apical cultures give conveniently positive streptococcal findings, and I have yet to meet with a sterile root, using whatever vaunted technique. But, save in acute abscesses, the streptococcus found is non-hæmolytic, and in a few cases investigated by me has failed to yield rabbit-killing toxin.

Bolton collects a long series of acute streptococcal infection associated with acute gastric ulcer. These include puerperal sepsis, scarlet fever, the suppurative

FIG. 7.

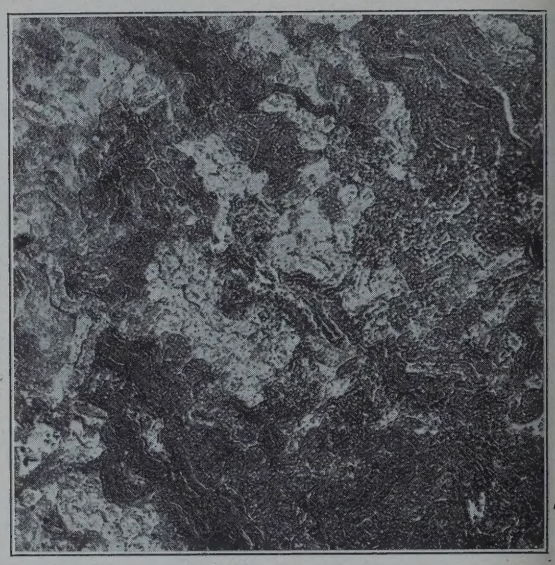


Kidney; glomeruli and convoluted tubules; exudate in capsule, and degeneration of convoluted tubules. Death in 24 hours following intravenous injection of 2 c.cm. of toxin. (× 100.)

stage of small-pox, and erysipelas; and many other conditions are mentioned in which, though the organism is not noted, it is probable that the streptococcus was present. But most authorities agree that such a complication is altogether exceptional. I have only met personally one possible case, where hæmatemesis with gastric erosion complicated cerebral abscess of streptococcal origin. Hæmatemesis, as opposed to frank gastric ulcer, is, however, related in another way to streptococcal infection, and this will be considered below in connexion with purpura.

Reference must nevertheless be made to the work of several authors on the relationship between chronic focal sepsis and chronic gastric ulcer. There is an hypothesis that streptococci localised in certain arbitrary situations may thence be transported in the blood stream, and by ingrained affinity settle down exclusively in new localities. This is particularly the view of Rosenow,[24] and the point must be stressed

FIG. 8.



Kidney; cortex; complete necrosis of convoluted tubules. Death three weeks after the first of three injections of unconcentrated toxin, free from hæmolysin. (× 100.)

that gastric ulcer, on this view, is a septicæmic phenomenon, essentially involving localisation of living organisms. New evidence on this point has been produced by Haden[25] and by Nickel and Hufford.[26] These authors, by intravenous injection of living streptococci isolated from human cases of "focal sepsis," produced a high percentage of gastric hæmorrhages and ulcers. The photomicrographs appear to me to resemble the lesions produced by the toxin alone.

Thus elective localisation seems to be unnecessary as an hypothesis for the production of such lesions. It is true that streptococci were present in the lesions produced by the above authors. Prof. Dudgeon pointed out to me large Gram-positive bacilli in the ulcer shown in Fig. 2. I am unable to identify it; *B. subtilis* has been consistently grown from ulcer surfaces in these cases. However, if gastric lesions are produced by the toxin, circulating organisms might then settle there as a secondary event, whether they be streptococci or other organisms.

It is highly questionable how far the rabbit may legitimately be used as an experimental animal for gastric ulcer investigations. There are nearly fifty ways known of giving a rabbit gastric lesions of hæmorrhagic type, and Aschoff[27] states that it suffers from them spontaneously.

While, then, the direct relationship between streptococcal toxin and gastric ulcer is questionable this series goes to show that elective localisation is not essential to ulcer formation. Finally, chronic or perforating lesions were not produced.

Purpura Fulminans.

In the ultimate analysis, a percentage of human cases of severe and fatal purpura appears to be due to endothelial trauma. An excellent discussion of these cases is given by Frank[28]; the following case investigated by me, and under the care of Prof. MacLean, may serve as typical.

A girl, aged 8, was admitted to St. Thomas's Hospital with widespread purpura, hæmatemesis, melæna, hæmaturia and epistaxis, and high temperature. Bleeding time, coagulation time, blood count and differential count, and platelet count were normal. There was great abdominal pain and tenderness.

No diagnosis was at first offered. A small abrasion was then noticed on the right thumb; it was of a week's standing. From it a hæmolytic streptococcus was isolated; within 24 hours a culturally similar organism was isolated from a superficial abscess over the left olecranon process (? acute bursitis). Blood culture was not performed. Large volumes of scarlet fever antitoxic serum (Burroughs, Wellcome and Co.) were administered intravenously and intramuscularly, as much as 50 c.cm. per day being given. All the symptoms rapidly improved, and eventually hæmaturia alone remained. Intermittent crops of purpura were controlled by serum. The child was discharged suffering from albuminuria, which has since disappeared.

A second somewhat similar case has been brought to my notice by Prof. Dudgeon, and for the following notes I am indebted to Dr. J. W. Hope-Simpson.

A female child, aged 1 year 7 months, was admitted with history of six weeks' cough and dyspnœa. An operation was performed for empyema and a pneumococcus found. Three months later she was readmitted, and on aspirating the chest a hæmolytic streptococcus was found. Fourteen days later a very large ecchymosis about 3 in. by 2 in. appeared on the left calf, and later on similar patches developed on both elbows, both feet, both wrists, the backs of the hands, and both knees. The patches were firm, slightly raised, and plum-coloured. Further patches appeared in different places until death, which took place one month after readmission.

Post-mortem Examination.—Hæmolytic streptococci were grown from the heart blood. 0·5 c.cm. of agar slope emulsion was injected into the muscles of a rabbit, but without effect. There were numerous bright hæmorrhages on the omentum and visceral peritoneum, but no general peritonitis. The spleen was normal in size, and a film showed streptococci. There were hæmorrhages in the substance of the suprarenal glands and all around them. There were hæmorrhagic spots under the pleura. The blood in the heart had not clotted.

The above cases are admittedly rarities, but many similar ones have been reported and are referred to in the paper by Frank (loc. cit.). In all specific fevers purpuric forms are known. In the case of the meningococcus and pneumococcus an intercellular hæmolysin is found, which may be responsible for the purpura; it has been shown that the intracellular pneumococcal hæmolysin can cause non-fatal purpura in mice.

But the influence of streptococcal toxin may sometimes be the main factor. Ikeda[29] has shown that in purpuric small-pox direct blood-films show streptococci during life and that post mortem there are submucous hæmorrhages throughout the gut. He attributes the purpura to the streptococcus. In scarlet fever, the purpuric form is a well-known entity, known to the Germans as *Zweite Kranksein*, and Frank defines scarlatinal nephritis as renal purpura. The association of burns, on the one hand with sepsis, and on the other hand with ulceration of the intestinal tract, is perhaps suggestive in view of the gastric lesions in rabbits. The acute oral sepsis of blood diseases in their terminal stages is associated with purpura, and the bacterial infection may perhaps, in addition to the platelet deficiency, be a cause of the purpura by absorption of toxin.

The rabbit does not appear to get cutaneous hæmorrhages. I have occasionally noted blue marks in the skin, but these appear to be due to the normal pigment of the chinchilla rabbit. On the other hand, the intense mammary hæmorrhages noted by Hartley occur in organs developmentally of cutaneous origin and fall under this category. Elsewhere, all the lesions found may be explained on the basis of specific endothelial damage. The analogy between the deaths in this series of rabbits and purpura fulminans in the second week of scarlet fever appears to me complete. In the rabbits in which estimation of platelets was made there was, in fact, no diminution. But opinion is divided on the diminution of platelets in human purpura fulminans, and in the case recorded by me it was not present.

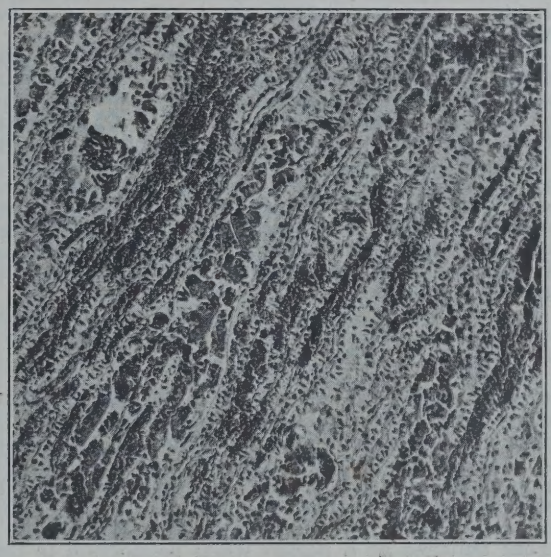
The suggestion arises from these experiments that, wherever purpura is associated, directly or indirectly, with acute streptococcal infection, it is due to the toxin of the streptococcus. In such cases, the use of antitoxic serum is indicated. It is necessary to specify antitoxic sera, since bactericidal sera are still obtainable and are devoid of antitoxic properties.

Hæmolysin.

The fact that, up to the present, analysis has failed to define "toxins" or "hæmolysins" in terms of chemical structure necessarily tends to much confusion of thought and of nomenclature.

The phenomena associated with their presence may be due to the formation by bacterial metabolism of fresh substances; they may equally be due to physical changes on the media, such as changes in the state of colloidal aggregation or of surface tension. Both words refer only to phenomena; the deduced substances have only hypothetical, though very

FIG. 9.



Kidney; medulla; hæmorrhagic necrosis of collecting tubules. Death in 12 hours following intravenous injection of 2 c.cm. of toxin. (× 100.)

plausible, existence. In writing of them, it is necessary either to beg the question and refer to them as substances of definite structure, or to use clumsy periphrases. I have therefore followed current use, and employed the conventional terminology.

Kolmer[30] defines toxins as follows:—

"Bacterial toxins may be defined as poisonous products produced by bacteria in both living tissues and artificial culture media. An essential property of a toxin lies in the fact that we can immunise a subject against it, and are able to demonstrate the presence of an antitoxin within the serum of an immunised animal."

If we adopt this definition—and no better one seems available—the alcohol precipitate which I have employed contains toxin.

However, early cultures of certain streptococci have the property of lysing red cells. Is this substance a toxin? And is it the same substance?

By general admission, it does not comply with the second paragraph of Kolmer's definition; antibody formation is never found. I find animals immunised against toxin to be susceptible to hæmolysin; and find antitoxic sera devoid of antihæmolysin "in vitro." Other antitoxic sera, such as diphtheria antitoxin, do contain antihæmolysin, and there are some who suppose the substances to be identical.† But this is not true of the streptococcus, as far as we

† Mason and Glenny[31] titrate the toxin of *B. welchii* by estimating its hæmolytic power.

know. It would be absurd to presume that the mechanism of all hæmolysis is identical in fundamental characteristics. For example, hæmolysis by sera from animals immune to the red cells of other animals requires "complement" for its completion; streptococcal hæmolysins I find unaffected by fresh serum. Streptococcal hæmolysin may be as distinct from other hæmolysins as it is from the immune hæmolysin.

It is unnecessary here to refer in detail to the literature on streptococcal hæmolysin. It is fully collected in a paper by Cesari, Cotoni and Lavalle.[32] To their summary may be added that recent work tends to point to variability in hæmolysin production of a given strain, and to the confinement of hæmolysin production, in certain strains, to anaerobic cultures.

McLeod[33] has suggested that all toxic effects of the streptococcus may be due to the same substance, and with Channon, has recently shown that a filtrate which is hæmolytic also lyses white cells in vitro. These two authors also ascribe both the latter actions to one substance. But Frobisher[34] has found a tissue-digesting enzyme in streptococcal filtrates, and, since this is present in non-hæmolytic and hæmolytic filtrates, assumes a distinction between the two properties.

The hæmolytic power of streptococcal strains varies greatly, and "Dochez" is rather poor, rarely yielding hæmolytic filtrates capable of lysing 0·5 per cent. red cells at a dilution of over 1 in 100. Channon and McLeod used a very much more powerfully hæmolytic strain, and succeed in killing rabbits by intravenous injection of 10 c.cm. They produce hæmoglobinuria, hæmorrhagic lesions throughout the body, and focal necrosis of the liver. Other authors have used centrifugalised cultures, since hæmolysin does not always pass a filter and, if it does, loses much of its hæmolytic power.

In no case, so far as I can find, has any author used antitoxic sera in the investigation of the effects of hæmolysin. Thus experiments are apt to be confusing since, if a filtrate is used, toxin as well as hæmolysin may be present and, if centrifugalised cultures are used, living organisms are present in addition. In order to obtain high titre hæmolysin, it is essential to add serum to cultures. In the preparation of toxin, serum has never been used by me; and thus I cannot say whether in fact toxins appear, in a strength capable of killing a rabbit in serum cultures at a period when hæmolysin is high in titre.

The effect of intravenous injection of hæmolysin was tested on 20 rabbits. In doses of 10 c.cm. a filtrate hæmolytic up to a dilution of 1 in 80 on 0·5 per cent. cells produced no clinical effects; the rabbits had all been previously immunised against toxin. When killed, no changes were anywhere demonstrated. On intraperitoneal and intramuscular injection, however, local hæmorrhage was found.

The reasons why streptococcal toxin and hæmolysin are not identical may be summarised as follows:—

1. Toxin is absent, using the rabbit as test animal, in precipitated cultures up to the first 24 hours.
2. Hæmolysin is at its strongest at some period between the sixth and twenty-fourth hours.
3. Toxin is found at the seventy-second hour, and may persist till the fourteenth day at least.
4. Hæmolysin, under the conditions of these experiments, is usually absent at the seventy-second hour and always at the fourteenth day.
5. Toxin can be precipitated by alcohol and acetic acid.
6. Hæmolysin cannot be precipitated by such precipitants. The addition of fresh serum to the redissolved precipitate, oxidation by bubbling air through the fluid, or reduction by Neill and Mallory's [36] method, and the adjustment of the reaction to ranges between pH 8 and pH 6 fail to return hæmolytic properties to the solution.‡
7. Toxin, on injection into muscles, produces no local changes, but severe general symptoms and renal changes.
8. Hæmolysin, similarly injected, produces a typical tabby-cat striation of muscles, due to punctate hæmorrhages and hæmorrhage into fascial planes. It produces no general symptoms.
9. Toxin, injected intravenously or intramuscularly, produces extreme leucocytosis.
10. The injection of hæmolysin causes leucopenia, as is shown below in one series of four rabbits; actually 14 were used at different times. A 24-hour filtrate of 5 per cent. serum broth culture of Dochez (titre 1 in 80 using 0·5 per cent. red cells) was injected in 10 c.cm. doses intravenously. All animals had previously been immunised against toxin and 24 hours before the experiment 1 c.cm. of antitoxin was administered intravenously in addition.

Rabbit.	Before experiment.	4 hours after.	6 hours after
1	10,500	5,500	8,400
2	11,300	7,700	6,900
3	7,000	4,600	6,400
4	11,900	7,900	Aborted

The leucopenia appears to be due to a diminution in the lymphocytes—e.g., in rabbit 1:—

	Before injection.	4 hours after
Polymorphs	15	49
Small lymphocytes	82	47
Eosinophils	1	2
Mast cells	2	2

This leucopenia may perhaps be related to the leucocyte destruction shown by Channon and McLeod; it may equally be due to shock following intravascular hæmolysis. The red cells never showed any change after injection of hæmolysin.

In view of the marked differences between streptococcal hæmolysins and other hæmolysins, it was thought possible that it might be a crystalloid in spite of statements that it cannot be dialysed.

Thin collodion sacs were made and sterilised in 75 per cent. alcohol. Thence they were placed in saline. A 24-hour serum broth culture of Dochez was procured, and the titre of its hæmolysins found to be over 1 in 80 using 0·5 per cent. cells. A suspension of 0·5 per cent. human cells was then prepared in the same medium, and 2 c.cm. were placed in a sac; the sac was suspended by a thread in the culture. After 24 hours there was no hæmolysis. Therefore the hæmolysin appears not to be crystalloid.

Discussion on Above Results.

Parish and Okell[37] have pointed out that, while rabbits can be protected against death within a few days, after injection of living organisms, by antitoxic serum, chronic infections are never prevented. That has been my own experience with rabbits immunised by toxin injections; peritonitis and arthritis were the terminal infections. In human infections with hæmolytic streptococci antitoxic serum is often dramatic in its effect. Infections with α-hæmolytic strains, on the other hand, and with certain β-hæmolytic strains not biologically distinct from the Dochez strain, were completely unaffected by the serum used.

The toxin of the streptococcus therefore seems to be only one of many weapons of the streptococcus and peculiar to some strains, in my experience α- β-hæmolytic. All the lesions caused by the toxin

‡ One experiment on the attempted reduction of the precipitate may be given in full. Neill [32] found that many bacterial hæmolysins became inactive, on being kept, through oxidation. This was true of *B. welchii* and of the streptococcus. Further, the intracellular hæmolysin of the pneumococcus is precipitable by absolute alcohol. It is then, however, inactive, but can be reactivated by reduction. It was therefore possible that the precipitate from my cultures contained inactive hæmolysin. A six-hour culture of the streptococcus, which was hæmolytic up to 1 in 80 against 0·5 per cent. sheep's cells, was precipitated as above described, and redissolved. A 24-hour culture of *B. welchii* was similarly treated. On testing the redissolved streptococcal preparation was non-hæmolytic; the *B. welchii* preparation showed concentration of the hæmolysin. 0·1 g. of $Na_2S_2O_4$ was placed in a tube. Immediately before use 25 c.cm. of 0·1 M. phosphate buffer solution, pH 7·4, was added. 0·2 c.cm. of this solution was taken and added to 1 c.cm. of the redissolved precipitate, and the volume made up to 2·2 c.c. with the phosphate buffer. The mixture was immediately placed in an anaerobic jar and evacuated; it was then left for 30 minutes. No evidence whatever of hæmolysin was found. In order to control this experiment a filtrate of "Dochez," which had lost hæmolytic power on being kept, and a similar one of *B. welchii*, were treated by Neill's technique. Reactivation was found, but it was incomplete; in neither case was the final titre of the reduced hæmolysin equal to its initial highest titre. This last experiment was kindly carried out for me by Dr. L. S. Penrose. Channon and McLeod (loc. cit.) also failed to reactivate completely streptococcal hæmolysin by this technique.

may be explained on the basis of endothelial damage, and antitoxin can only protect against that factor in streptococcal infection—a factor only rarely predominant.

Hæmolysin, as made by the Dochez strain, appears to be in itself comparatively innocuous. Even 20 c.cm. of an unusually vigorous preparation was devoid of effect in a rabbit immune against toxin on intravenous injection. It does, however, produce peritoneal hæmorrhage on intraperitoneal injection, and petechial hæmorrhage on intramuscular injection into toxin-immune rabbits.

The different results obtained by other writers may be due in part to the use of strains with greater power of hæmolysin production. As, however, in no case were antitoxin controls used, they may also be due to the injection of toxin. It is true that early cultures must be used to obtain hæmolysin, and that early cultures contain little toxin when no serum is used in the medium. The use of serum may conceivably modify toxin production, and the simultaneous injection of toxin and hæmolysin may produce effects not found with the injection of either substance separately in the doses used.

Finally, the action of toxin and hæmolysin in the tissues may well modify the further pathogenic action of the streptococcus itself.

Experiments are being performed to determine the minimum lethal dose of living organisms when injected, with and without hæmolysin, in toxin-immune rabbits.

Summary.

1. Certain strains of streptococcus produce both toxin and hæmolysin. The pathogenic activity of streptococci is not dependent solely on the toxic power, since animals immune to it may yet be killed by living organisms, although surviving longer than controls.

2. Toxin and hæmolysin are different substances, formed in culture at different times, producing different lesions in the rabbit, differing in their behaviour to globulin precipitants and in their power to evoke immune bodies.

3. Toxin, in rabbits, produces leucocytosis, hæmorrhagic nephritis, hæmorrhagic erosion and ulceration of the stomach, and hæmorrhagic lesions in mammæ, lungs, and peritoneum. It produces no changes locally on intramuscular injection.

4. The hæmolysin of "Dochez" produces leucopenia, local hæmorrhage on intramuscular injection and on intraperitoneal injection, in animals immune to toxin. Otherwise it is devoid of effect under the conditions of these experiments.

5. The human conditions best paralleled by the lesions of this toxin in rabbits are those found in purpura fulminans.

My thanks are due to the following: to Sir C. S. Wallace and Prof. H. MacLean for facilities for this work; to Prof. L. S. Dudgeon for advice and criticism; to Dr. A. L. Basham for the photomicrographs, prepared in the Unit Laboratory; to Dr. R. A. O'Brien for the strain of organism and the antisera used; and to my assistant, Mr. P. Carter, for his help and many valuable suggestions.

References.

1. Laitinen, T.: Centralbl. f. Allgem. Pathol. und Pathol. Anat., 1896, vii., 358.
2. Roger, H.: Rév. de Méd., 1892, xii., 929.
3. Stoddard, J. L., and Woods, A. C.: Jour. Med. Res., 1926, xxxiv., 343.
4. Duval, C. W., and Hibbard, R. J.: Jour. Exper. Med., 1926, xliv., 567.
5. Parish, H. J., and Okell, C. C.: Jour. Path. and Bact., 1927, xxx., 521.
6. Gray, J.: Ibid., 1928, xxxi., 191.
7. Hartley, P.: Brit. Jour. Exper. Path., 1928, ix., 259.
8. Besson, A.: Technique Microbiologique, Paris, 1921, ii., 418.
9. Pulvertaft, R. J. V.: Brit. Jour. Exper. Path., 1928, ix., 276.
10. Grinnell, F. B.: Jour. of Bact., 1928, xvi., 117.
11. Todd, E. W.: Jour. Exper. Med., 1928, xlviii., 493.
12. Frobisher, M., and Denny, E. R.: Jour. of Bact., 1928, xvi., 109.

(*Continued at foot of next column.*)

INTERNAL DERANGEMENTS OF THE KNEE-JOINT.*

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"Internal derangements of the knee-joint" is an arbitrary term without logical basis. In this paper I shall confine my remarks to injuries to the menisci, injuries to the spine of the tibia, and loose bodies.

In all cases where I suspect one of these three conditions I do a complete exploratory operation, splitting the patella vertically and pulling the two halves widely apart, so as to expose the joint as fully as possible. I believe that this is the only way to be certain of dealing with the particular trouble which may be present. With one minor exception (see later) I have observed no ill-effects from this procedure, and I believe it to be harmless.

Technique of Operation.

The whole limb, having been shaved and painted with iodine, is raised in the air, and a rubber bandage tourniquet is applied to the middle third of the thigh. The limb is lowered on to a sterile towel and a sandbag is placed beneath the buttock to counteract the tendency of the limb to rotate outwards. A second sandbag is put beneath the knee.

A vertical incision through the skin and subcutaneous tissues is made in the mid-line, starting from a point 5 in. above the patella and extending to a point 3 in. below it. The edges of the wound thus made are slightly undercut, and are hidden from the area of operation by sterile towels clipped on with tissue forceps. The patella is split vertically with a chisel and mallet; with a fresh scalpel the split in the patella is continued up between the fibres of the quadriceps tendon and down between the fibres of the ligamentum patellæ, for the full extent of the wound. The two halves of the patella are drawn widely aside with special retractors and at the same instant the knee is fully flexed by a third assistant. The subpatellar pad of fat is divided in the middle line down to the tibia. The whole joint is exposed and the abnormal condition present is dealt with.

* Based on a paper read before the Swiss Society of Surgery at Zug on May 26th, 1929.

References.

(*Continued from previous column.*)

13. Dietrich, W.: Klin. Woch., 1922, i., 1160.
14. Holmes, T. E.: Guy's Hosp. Rep., 1905, lix., 153.
15. Ledingham, J. C. G.: Jour. of Hyg., 1907, vii., 65.
16. O'Brien, R. A.: Okell, C. C., and Parish, H. J.: Brit. Jour. Exper. Path., 1929, x., 83.
17. Dochez, A. R., and Stevens, F. A.: Jour. Exper. Med., 1927, xlvi., 487.
18. Quoted by Ciuca.
19. Ciuca, M., Balteanu, I., and Toma, A.: Compt. rend. de la Soc. de Biol., 1928, xcviii., 397.
20. Cooke, J.: Proc. Soc. Exper. Biol. and Med., 1927, xxiv., 315.
21. Dudgeon, L. S., and Hope-Simpson, J. W.: Jour. of Hyg., 1928, xxvii., 160.
22. Eagles, G. H.: Brit. Jour. Exper. Path., 1927, viii., 403.
23. MacNider, W.: Phys. Rev., 1923–24, iii. and iv., 595.
24. Rosenow, E. C.: Jour. Amer. Med. Assoc., 1913, lxi., 1947.
25. Haden, R. L.: Arch. Int. Med., 1925, xxxv., 457.
26. Nickel, A. C., and Hufford, A. R.: Ibid., 1928, xli., 210.
27. Aschoff, L.: Path. Anat., 6th edit., Jena, ii., 716.
28. Frank, E.: Handbuch der Krankheiten des Blutes, Berlin, ii., 464.
29. Ikeda, K.: Jour. Lab. and Clin. Med., 1938, xiii., 440.
30. Kolmer, J. A.: Infection, Immunity, and Biologic Therapy, London, 1925, p. 92.
31. Mason, J. H., and Glenny, A. T.: Jour. Path. and Bact., 1928, xxxi., 629.
32. Cesari, E., Cotoni, L., and Lavalle, J.: Ann. de l'Inst. Pasteur, 1927, xli., 919.
33. McLeod, J. W.: Jour. Path. and Bact., 1915, xix., 392.
34. Channon, I., and McLeod, J. W.: Ibid., 1929, xxxii., 283.
35. Frobisher, M.: Jour. Exper. Med., 1926, xliv., 777.
36. Neill, J. M.: Ibid., pp. 209, 215, 252.
37. Parish, H. J., and Okell, C. C.: Jour. Path. and Bact., 1927, xxx., 521.

The two halves of the patella are then allowed to fall together and the whole gap between the split fibres of the quadriceps, the two halves of the patella, and the split fibres of the ligamentum patellæ is closed with one long continuous suture of chromic catgut. The stitches pass actually into the joint in bringing together the fibres of the quadriceps, then into the fibrous tissue covering the front of the patella, and again pass deeply to bring together the divided halves of the sub-patellar pad of fat. The skin wound is closed with interrupted horsehair. White gauze and three layers of cotton-wool are applied to the knee with a 6-in. bandage and the tourniquet removed. I employ no splint. When the patient is back in bed a small pillow is placed beneath the knee, a cradle is placed over the foot, and the end of the bed is raised on blocks. The patient is encouraged to start moving on the third day, to get up with crutches at the beginning of the third week, and to be back at work in six weeks.

In a series of 41 cases operated on at one hospital by this method there were found :—

	Cases.
(1) Mesial meniscus split or detached	17
(2) Lateral meniscus split or detached	4
(3) Loose bodies	10
(4) Spine of tibia fractured	5
(5) Joint normal, though injured meniscus suspected..	4
(6) Joint normal, though loose body suspected ..	1

(1) *Mesial Meniscus Split or Detached* (17 cases).—In every case the loose or torn piece of cartilage was cut cleanly away from the part which remained fixed in place ; that is to say, the whole cartilage was not always removed, but only the abnormal portion.

(2) *Lateral Meniscus Split or Detached* (4 cases).—In none of these had a diagnosis been made of injury to the lateral meniscus.

CASE 1, a girl of 22, a restaurant worker, was seen on March 24th, 1927. Four months previously she had stooped to pick up something and felt the left knee click suddenly. This was followed by a great deal of swelling which, however, subsided in a week. Since then she had felt a click whenever she straightened the knee, which jarred her and was uncomfortable ; occasionally there was pain and swelling on the outer side of the joint. On examination a definite click was felt just before full extension and a lesser click on beginning flexion. Both clicks appeared to be on the outer side of the knee-joint. A month later the patient stated that several times she had had difficulty in straightening the knee. At operation on July 5th, 1927, the anterior half of the lateral meniscus was found loose and split.

CASE 2, a boy of 10, was said to have broken his right leg four years before, and complained of his right knee letting him down frequently. He said it clicked and hurt whenever he ran and made him fall. On flexion the tibia dislocated inwards ; on extension the dislocation reduced audibly.

At operation on July 26th, 1927, the lateral meniscus was found loose, displaced inwards, and enlarged to quite ten times its normal size. It was lying on the articular surface of the tibia and completely interfering with normal movement. On section the enlarged meniscus was solid right through ; there was no cyst formation.

CASE 3, a man aged 34, had hurt his right knee three weeks previously when playing football. He had heard something click, felt a sudden great pain, and had to stop playing. The knee was bent and he could not straighten it ; it had remained bent ever since. I tried to reduce under gas, but failed. At operation, five days later, the lateral meniscus was found split transversely and the anterior cruciate ligament partly torn through. The loose anterior portion of the meniscus was removed.

CASE 4 is still under treatment. When first seen on March 21st, 1929, he told me he had had a cartilage removed from his right knee at University College Hospital, London, 17 years before. The knee had never been quite sound since. Two months ago he was getting out of bed when his right knee became fixed suddenly in the bent position. This has since happened five or six times.

At operation on April 15th a portion of the lateral meniscus was found loose in the joint, attached by its posterior cornu only. It was enlarged to the size of an irregular pea or orange pip, and had evidently been moving in and out between the bones. The anterior cruciate ligament did not exist ; shreds of it were found and were sutured together.

The scar of the first operation is on the inner side. I suggest that the surgeon was dealing with a case of ruptured anterior cruciate ligament which had taken up the anterior cornu of the lateral meniscus with it, and that he removed all the lateral meniscus he could reach and the anterior cruciate as well.

(3) *Loose Bodies* (10 cases).—Two of these were remarkable.

CASE 1, a shoeing-smith aged 30, stated that two months earlier he had been shoeing the hind hoof of a horse when it suddenly pulled back while he was stooping and caused him to over-extend his right knee violently. It was frightfully painful for two or three minutes and he hardly knew how to bear it ; then the pain eased off and he went on with his work. Next day the knee was twice the size of the other and very painful, but he went to work and remained at work until three weeks before examination, when, in turning round sharply, the knee gave way and became bent and remained so for two or three days. He could feel something loose under the skin on the outer side, which he could move about.

At operation a slice of articular cartilage the size of a shilling was found almost completely detached from the outer and lower aspect of the mesial condyle, and a much smaller portion was completely loose and free in the joint. The cavity in the condyle from which the pieces of cartilage had come was healed over in its whole extent with a thin bluish-white film.

CASE 2 was a man aged 58 with advanced osteo-arthritis of the right knee. The joint was tightly distended, apparently with fluid, and it was for this distension that he sought relief. On opening the knee large masses of bright yellow fat-like material welled up out of the joint. There was quite half a pint of this, and it was present in the joint under considerable pressure. The joint itself showed advanced osteo-arthritis, with erosion of cartilage and hypertrophied synovial fringes. The yellow material was completely free in the joint, and was considered by me to be a lipoma which had somehow become detached. On section and microscopical examination, however, the following report was received :—

"The masses appear to be composed of a fibrinous material. Although in a few places a vessel and a small amount of fibrous tissue can be seen, for the most part there is no organised structure ; fat is not present."

(4) *Spine of Tibia Fractured* (5 cases).—Four of these cases have already formed the subject of a communication by me which has appeared in the *Journal of Bone and Joint Surgery*. They were operated upon within a fortnight of the injury. In each of them, when the patella had been split and the two halves drawn widely apart, the knee being fully flexed, the fragment of bone torn out of the top of the tibia was seen lying in the intercondylar notch, attached above and posteriorly to the anterior cruciate ligament and externally to the anterior horn of the lateral meniscus. The place from which it had been torn was represented by a deep hole in the upper surface of the tibia. Attempts to replace the fragment were entirely prevented by the lateral meniscus, which appeared to have become shrunken or contracted. It was therefore divided with a tenotome at a point a quarter of an inch away from its attachment to the fragment. With a pair of dissecting forceps the latter could then be put back exactly in place in the top of the tibia, the anterior cruciate ligament being still attached to it. With the forceps holding the fragment the knee-joint was moved from complete flexion to complete extension, in which position there was no tendency for the fragment to shift when the forceps was removed ; in fact, the condyles seemed to ram it home most effectively. So no suture of any kind was used, the limb being enclosed at once in plaster. After a month the plaster was removed and massage and gentle movements started. Three of the cases recovered completely ; the fourth, in which the head of the tibia was also fractured, was not able eventually to flex the knee to less than 80 degrees.

The fifth case was not seen until eight months had elapsed, and occurred in a chauffeur, as the result of a motor accident. He spent three months in bed, and the knee had been bent ever since at an angle of 120 degrees. It was impossible to straighten it because of a bony block. The lateral X ray showed a large shadow in the joint anteriorly in the angle between the femur and the tibia. At operation a mass of bone was found here, rising up from the floor of the anterior intercondylic fossa ; this was chiselled off

allowing the knee to be straightened. Seen six years later, May 9th, 1929, he was completely cured, except for the last 10 degrees of extension. He had been at work ever since discharge.

(5) *Joint Normal, though Injured Meniscus Suspected* (4 cases).

In one case I used the "internal lateral" route instead of the split patella, and had a very poor view of the joint. As I could see nothing wrong I closed the wound. Now, after six and a half years, he complains that his knee still goes wrong and locks, so there is evidently some derangement which should be attended to.

In the second the menisci were healthy, but a tag of fat was lying in between the tibia and internal femoral condyle, and was removed. I doubt, however, whether this could have been the cause of the symptoms. A year later the patient reported he had been back at his work as a blacksmith for 11 months; his knee was normal.

In a third case, where there was a history of two attacks of locking and the diagnosis had been made by my assistant, nothing abnormal was found. Seen three and a half years later the knee was normal and never troubled the patient at all. He is at work as a slot-gas collector, and has to carry heavy bags full of copper coins.

The fourth case is noteworthy; it occurred in a girl of 18. Her doctor wrote: "to see Mr. Roth for ? dislocation of the semilunar cartilage. The knee is flexed and cannot now be extended." The patient informed me it was her fifth attack of locking. I tried to reduce, but failed, then had gas administered and reduced at once. As she had had so many attacks I advised operation and opened the knee five days later. To my surprise the interior of the knee was normal. Seven months later the knee became locked again, and again two months after that. I advised a knee-cage. When seen for the last time after some months the knee seemed perfectly sound. Was this a case of hysterical knee?

(6) *Joint Normal, though Loose Body Suspected.*—In this case X rays showed a shadow behind joint, but nothing was found at operation.

Remarks.

The small number of meniscus cases is explained by the fact that it is my custom to reduce displacements where possible under gas, and not to advise operation unless the displacement occurs a second time. In a very large number of cases it never does occur again. Where operation is decided on I believe, as already stated, that the surest way to avoid mistakes and obtain complete relief of symptoms is to split the patella and have a clear view of the joint. Sepsis has been entirely absent. In one case superficial sepsis occurred in the lower part of the wound, but there were three unusual factors to consider: there was some delay in the sterilisation of the instruments, it was a fresh theatre sister's first day with me, and my assistant was away ill. I ought not to have operated. Under normal conditions sepsis does not occur.

Fear of non-union between the divided halves of the patella is groundless. Clinically, at least, no damage is done to this bone and no unfavourable effect is produced. Where an X ray has been taken years later slight osteo-arthritic changes have been observed, but they do not seem to be of the slightest importance. I suggest that the division of the patella is much less harmful than a horizontal or oblique section of the internal lateral ligament. I believe that the operation for the removal of damaged menisci done by this method gives a 100 per cent. cure. It enables the surgeon to remove accurately and completely the whole of the loose or torn portion and, on the other hand, it ensures that he will not remove undamaged structures.

I have written to all these patients, and of the 21 meniscus cases 10 have come to see me. They are all perfectly well, at intervals of from one to six years after operation. There has never been any return of symptoms and all of them profess and appear to be perfectly recovered. At the worst one or two complain of slight aching in damp weather, or of not being able to kneel on a hard surface with comfort. Yet I have seen statistics published by other surgeons where unsoundness of the joint has persisted in from 30 to 40 per cent. of cases. Such statistics naturally bring discredit upon operative treatment and encourage recourse to unqualified bone-setters.

I can conceive of no other method which will give the perfect view required for reposition of the bone in fracture of the tibial spine and for the removal of loose bodies.

Post Scriptum.—The difficulty of operating through a small lateral incision is recognised by Prof. Fritz Steinmann, of Berne, who has devised a new instrument, the "meniscotome." This is made on the same plan as a tonsillotome. The ring of the instrument is made to encircle the free end of the detached meniscus and is pushed back along it as far as it will go; the knife then slides across the ring and cuts off the meniscus. Prof Steinmann claims that in this way none of the loose part can ever be left behind and that so little damage is done to the knee that the patient may be allowed up to walk on the day after operation.

Clinical and Laboratory Notes.

THE ASSOCIATION OF HUMAN AND CANINE JAUNDICE, WITH AN ILLUSTRATIVE CASE.

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It has always been surprising that so few cases of Weil's disease should be reported in this country, considering that as many as 20 to 30 per cent. of adult English wild rats harbour leptospiras which are almost certainly pathogenic to man. At one time it appeared possible that the epidemics of "infectious jaundice," which are by no means rare among school-children, might be ascribed to leptospiral infection, but the more fully these epidemics have been investigated the more unlikely it seems that they are due to this cause (Cockayne, 1912; Morgan and Brown, 1927; Booth and Okell, 1928). The present view, almost universally held, is that the infectious jaundice of children is a disease sui generis. In 1925 (Okell, Dalling, and Pugh) it was shown that the common malignant jaundice (or "yellows") of dogs was due to infection with *Leptospira icterohæmorrhagiæ*. When the close intimacy that exists between human beings and dogs is considered it becomes even more surprising that leptospiral disease, which is *par excellence* a contact infection, does not occur more frequently in man.

Leptospiral disease in dogs is a disease of high mortality; 90–100 per cent. of the affected puppies may die and some foxhound kennels lose as many as half of their annual puppies in this way. The disease affects practically all breeds of dogs, but is most common in kennelled dogs such as foxhounds and beagles. The signs, symptoms, and post-mortem appearances closely resemble leptospiral disease in man and other animals. Jaundice and hæmorrhagic signs are almost constantly present, petechial or even massive hæmorrhages in the lungs being particularly characteristic. In puppies intussusception, the result of hæmorrhagic enteritis, is a frequent terminal complication. For a more detailed description of the disease reference may be made to the paper already referred to (Okell, Dalling, and Pugh, 1925).

Records of the association of human and canine jaundice are very few. The first case we have been able to trace was that reported by Krumbein and Frieling in 1916, where two officers, living in the same room as a dog suffering from jaundice, developed what appeared to be typical Weil's disease. This observation

tion antedated the recognition of the leptospira as the cause of Weil's disease. Uhlenhuth and Fromme (1919), in their classical paper on leptospiral jaundice, mentioned a case of jaundice in the dog which they proved almost conclusively to be leptospiral. They were investigating an area where human cases of Weil's disease occurred, though there was no direct connexion between the canine and any human cases. When it became evident that such a common disease as "yellows" in dogs was of a leptospiral nature inquiries were made with a view to tracing cases of associated human and canine jaundice (Okell, 1925), but only two instances were discovered, one of which was reported to us by Prof. R. D. Passey, the other by Dr. R. Stirling and Mr. Lornie, M.R.C.V.S., of Perth.

The following case has recently come under our notice :—

A. B., aged 52, first whip of a pack of foxhounds, had been nursing several puppies affected with "yellows" and had performed several post-mortem examinations with naked hands during the three to four weeks previous to the onset of his illness. He had also been bitten by a fox about ten days previously, but nothing abnormal had been noted in the fox. On Dec. 11th, 1928, he had been hunting and had been suddenly seized with shivering and intense pains in the back, loins, legs, arms, and neck. He had to go to bed immediately.

On Dec. 12th, when first medically examined, he was flushed and obviously ill. Temp. 101° F., pulse-rate 140. His conjunctivæ were intensely congested and there were definite hæmorrhages beneath the conjunctival membrane. At this stage there were well-marked pulmonary signs and symptoms—patches of bronchial breathing and expectoration of blood-stained sputum. There was little cough and the respiration-rate was not appreciably increased. A provisional diagnosis of mild broncho-pneumonia was made at this stage.

On the fourth day of the illness jaundice became apparent. It quickly deepened to an intense orange yellow colour and with the onset of jaundice the temperature rapidly fell. The fæces were pale and the urine nearly black with bile-pigment. There was no tenderness over the hepatic area. The liver and spleen appeared to be of normal size. During the first week there was intermittent hiccup and on two or three occasions slight epistaxis. The pulmonary signs quickly cleared up and the jaundice deepened almost to a bronzed colour by the tenth day. At this time the posterior cervical glands were noted as enlarged and the lymphatic vessels in the region as thickened.

The diagnosis of Weil's disease was now almost certain. 10 c.cm. of antileptospiral serum of known potency was then given and five days later a further 10 c.cm. By the end of the fourth week albuminuria was detected which persisted for about eight to nine weeks; the patient made an uneventful recovery except for a slight exacerbation of temperature at the end of the third week of illness. Examination of the urine during the fourth week proved negative for leptospiras both on direct examination and by guinea-pig inoculation. The distance of the case from the laboratory made it impossible to investigate the pathology of the case in detail. From the clinical course of the disease alone, however, an almost certain diagnosis could be made of Weil's disease.

It should not be overlooked that the possibility of human beings contracting Weil's disease from affected dogs appears on theoretical grounds to be no slight one. So far as is known the pathogenic leptospiras consist of one species of micro-organism and infection from one animal's species to another is experimentally easy. The greatest risk is no doubt in the handling of internal organs—e.g., at post-mortem examination—since these usually contain the leptospira. The virus is easily transmissible by skin contact, and though we have never been able to infect guinea-pigs by placing virus on the intact skin we have been able to transmit the disease with regularity by placing a drop of virus-containing organ extract on a slightly scarified area.

Possibly the association of human with canine jaundice is not so uncommon as the recorded cases would suggest, and it is in the hope of attracting the attention of medical and veterinary practitioners, particularly in rural areas that we have thought it worth while to report this case.

References.

Cockayne, E. A.: Quart. Jour. Med, 1912, vi., 1.
Morgan, M. T., and Brown, H. C.: Ministry of Health Reports on Public Health and Medical Subjects, 1927, No. 42.
Booth, W. G., and Okell, C. C.: Public Health, 1928, xli., 237.
Okell, C. C., Dalling, T., and Pugh, L. P.: The Veterinary Journal, 1925, lxxxi., 1.
Krumbein, R., and Frieling, B.: Deut. Med. Woch., 1916, xlii., 564.
Uhlenhuth, P., and Fromme, W.: Zeit. f. Immun. (Orig.), 1919, xxviii., 70.
Okell, C. C.: Proc. Roy. Soc. Med. (Sec. of Compar. Med.), 1925, xviii., 17.

ON THE MODE OF ACTION OF IRRADIATED ERGOSTEROL

UPON THE MYELIN FORMS OF LECITHIN.

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DURING an inquiry into the factors which initiate and promote the formation of myelin threads and droplets by lecithin when in contact with water, it was found that irradiated ergosterol (vitamin D) exercises a marked effect.

A solution was made in chloroform of approximately equal parts of ergosterol and pure lecithin. The lecithin used was prepared by Levene's process, and was kindly obtained for me from America by Prof. H. McLean.

The solution was divided into two portions. Portion A was exposed in a quartz tube to the rays from a mercury-vapour lamp for half an hour at a distance of 18 inches. Portion B was kept as a control. A drop from each portion was then allowed to evaporate on a slide. The film deposited from A appeared to the naked eye more translucent and homogeneous than the more opaque granular deposit from the non-irradiated B. On adding a drop of normal saline to each film and covering with a cover-slip, examination under the microscope showed a marked activation of the lecithin (by hydration or water absorption) in the radiated portion A. The lecithin begins almost immediately to form droplets and throw out myelin threads, especially in the thinner areas of the film. The rosettes of needle crystals formed by the irradiated sterol deposited from the chloroform solution also show lecithin droplets and threads round their edges.

The non-irradiated film is considerably slower in showing activity. Under dark-ground illumination the difference between the irradiated and the non-irradiated film is more easily appreciated.

It is important to examine the films at once, and at short intervals, because the active phase, during which the protrusion of myelin threads and the formation of droplets takes place, is a transitory one, and ceases sooner in the more fully hydrated and irradiated than in the non-irradiated film. Examination of the two films with polarised light shows that the myelin threads or projecting worm-like processes, which grow from the surface and edges of the deposited lecithin (as hydration proceeds) polarise well, while the isolated droplets which bud from the ends of these myelin stalks give a bright appearance with a terminal dark Maltese cross. The arms of this black cross correspond to the vibration planes of the polarising prisms (like a starch grain). The polarising capacity, which expresses the physical and not the chemical character of the material, is most marked along the edge or skin of the droplet or thread where the pellicle is thickest. As the threads grow in size the wall becomes thinner and the polarising capacity less marked. Thus, the film which contains the irradiated ergosterol undergoes hydration sooner, and passes more rapidly into the expanded thin-walled phase, than the more slowly reacting non-irradiated film.

A careful study is being made of the staining reactions of lecithin under different conditions, irradiated and not irradiated. Much has been learned, but the problem is so large and so complex that much more investigation is necessary before final or useful results can be arrived at. I have confirmed Prof. J. B. Leathes's observations[1] that the presence of cholesterol in the proportion of one part of cholesterol to four parts of lecithin does not inhibit—in our experience it actually increases—activity in lecithin when covered with water. Neither does cholesterol, in this concentration, inhibit the activating effect of vitamin D on lecithin, though it is possible that it might do so when present in larger proportions.[1]

It is necessary to inquire whether the activating effect is still present when the concentrations used more nearly resemble those present in the body during

[1] THE LANCET, 1925, i., 958.

life. If we assume (see Leathes[2]) that in 100 g. of wet body-weight the amount of lecithin will be about 2 g., and if we regard the effective dose of vitamin D as 2 mg. in rickets (K. H. Coward[3]) then we have some indication of the relative proportions of ergosterol and lecithin to use outside the body in order to make these in vitro and in vivo experiments comparable.

For convenience of experiment we worked with an 8 per cent. solution of lecithin in chloroform, a 2 per cent. solution of cholesterol in chloroform, and a 0·0001 solution of ergosterol in chloroform. To exclude any possible effect of radiation on the lecithin itself when irradiated in solution with ergosterol, we irradiated the ergosterol in a quartz tube and then added the unradiated lecithin solution in equal volume. After evaporation, a drop of distilled, recently boiled, water, or normal saline, was placed on the film, which was then examined, covered or uncovered, under the microscope.

At this low percentage, in which the ergosterol lecithin ratio presumably corresponds with that existing in the living body, the effect of the irradiated as compared with the non-irradiated sterol is slight. The difference becomes easily recognisable when the strength of the ergosterol is raised to 0·001 per cent. and becomes very marked when the strength of 0·01 per cent. is reached.

The following experiment shows that the effect on the lecithin is due to vitamin D, and not to any peroxide of ergosterol which forms on the irradiation of the sterol in contact with the air.

If two films or smears of ergosterol are made on a glass slide and irradiated, one in the air and one through a film of water covered by a quartz slip, the air being thus excluded, only the irradiated sterol from the film protected against contact with the air activates the lecithin. The sterol irradiated in contact with air fails to do so.

The question arises whether we can associate these findings with the changes which can be observed in living cells as the result of exposure to the action of irradiated sterol. I have shown[4] that living leucocytes, when incubated in blood or in blood serum on a thin film of irradiated ergosterol in a closed cell, respond sooner and more strongly than corresponding cells incubated on an ergosterol film which has not been previously irradiated. The cells in the irradiated film show increased pseudopodial activity, and they elaborate droplets of iodophil substance sooner and in larger quantity than the cells in the non-irradiated film. I have also shown in earlier papers that this formation of iodophil substance depends on nuclear and cytoplasmic changes, especially in the perinuclear lipoid-protein membrane. The significance of this observation lies in the observed influence of certain fat-soluble substances on this perinuclear membrane, which is now believed to be composed, in part at any rate, of lecithin, possibly in combination with cholesterol and other proteid substances.

Thus we have some evidence, based on experimental and direct observation, which suggests that irradiated ergosterol (vitamin D) exerts its influence primarily on the lipoid rather than on the protein elements in the cell. In this way it renders the cytoplasmic and perinuclear lipoid membranes more permeable, and increases nuclear cytoplasmic interchange.

Does the irradiated sterol produce this change in the cell membranes as the result of an inversion of phase of the constituents in a fat-water emulsion, or does it reverse the orientation of the lecithin molecules, thus directing the hydrophil chemically active pole towards the exterior?

My observations, if applied to rickets, suggest that the vitamin D acts on the bone cells concerned in calcification and speeds up their calcium-phosphorus metabolism by acting on the lipin constituents (especially the lecithin moiety) of the cells, and by facilitating interchange through the pericellular and perinuclear membranes, enables these cells to extract the calcium phosphate from the blood.

If, as I hope, they can be confirmed, a further step will, I think, have been taken in the fuller understanding of the mode of action of one of the fat-soluble vitamins on the organism.

I desire to acknowledge the great help I have received from Mr. Frank Young in this investigation, and also from Prof. Leathes's Croonian Lectures, published in THE LANCET in 1925.

[2] Ibid., p. 803.
[3] Quoted by Rosenheim and Webster, THE LANCET, 1927, ii., 622.
[4] Trans. Brit. Assoc. (Physiol. Sect.), 1927.

A CASE OF ILEOCÆCAL INTUSSUSCEPTION WITH SPONTANEOUS REDUCTION.

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A SOMEWHAT unusual case of intussusception was recently admitted to Ancoats Hospital, under the care of Mr. E. E. Hughes, with whose permission the following notes have been written.

A male child, aged 11 months, was seized with colicky abdominal pain at midday and vomited twice. He was taken to Dr. J. Scanlan, who found blood on his finger-tip after doing a rectal examination and diagnosed the case as one of intussusception. On arrival in hospital, examination revealed a quite definite tumour, of typical shape, to the right of and above the umbilicus, and also an emptiness in the right iliac fossa. This was at or about 6 P.M. The child at the time seemed very ill with intermittent abdominal colic, but subsequently quietened down considerably and did not vomit again.

Before going to the operating theatre I examined the abdomen and could find no tumour of any kind. The rectum contained fæces. The advisability of operation seemed doubtful, for I had not personally found any evidence in support of the diagnosis, save a definite history and the report of previous examinations. An enema was given, which produced a good result stained with blood and mucus. Laparotomy was decided upon, the possibility of spontaneous reduction being mooted but dismissed as highly unlikely. I may add that there were no purpuric or arthritic symptoms at this or any other stage of the illness.

On opening the abdomen I found the cæcum in its normal position, but both it and the last six inches of the ileum and appendix were deeply congested and œdematous. So altered was the appendix, that it seemed advisable to remove it.

The most curious feature of the case was that on taking a final review of the abdominal contents I discovered another, and obviously early, intussusception in the small intestine, about two inches long. There was no blueness or turgidity, so that this could not possibly have been the apex of the original one. It was reduced and the abdomen closed. At the time it did not seem justifiable to take out enough small intestine to make sure whether the second intussusception was the result of normal or retro-peristalsis. At the end of the operation 5 c.cm. of normal saline were injected into either flank and the baby was put back to bed with radiant heat and rectal salines. Recovery was uneventful.

I conclude with, I think, sufficient justification that this was a case of spontaneous reduction of an ileocæcal intussusception. Whether the second condition would have progressed or not it is hard to say. It is conceivable that, if retrograde, it may have been caused by the same retroperistaltic waves that produced the self-reduction. In any case, the tale seems worth telling; H. W. Carson[1] says that the spontaneous cure of intussusception is so rare that very few surgeons have seen a case and that the few recorded examples are almost legendary.

[1] Modern Operative Surgery, London, 1924, i., 694.

LIVERPOOL OPEN-AIR HOSPITAL FOR CHILDREN.—The annual report of this hospital, at Leasowe, Cheshire, states that an important advance in the treatment of crippling disease in childhood has been made by the opening of the new treatment block. The chief feature of the building is the artificial light department in which carbon-arc and mercury-vapour lamps of the latest pattern are installed to provide general light treatment for 12 lying or 50 sitting cases per hour; as it is possible to work these lamps for five hours a day, the needs of the 260 children in the hospital can be met adequately. The patients stay for periods varying from three months to nine years.

BRITISH MEDICAL ASSOCIATION.

ANNUAL MEETING IN MANCHESTER.

(*Continued from p. 284.*)

SECTION OF MEDICINE.

Cardio-Aortic Syphilis.

Prof. GEORGE MURRAY (Manchester) presiding, Dr. JOHN COWAN and Dr. J. STEVEN FAULDS (Glasgow) opened a discussion on Syphilis of the Heart and Aorta. They began by quoting estimates of the incidence of syphilis in the general population. Osler and McCrae had long ago estimated an incidence of 12 per cent. for Berlin and 15 per cent. for Paris. The speakers gave an estimate, based upon Wassermann reactions among their own ward cases, of 8·6 per cent. in males and 7·2 per cent. in females. Carey Coombs's figures were 9 per cent. in hospital and 4 per cent. in private patients. The incidence of syphilis among patients with defective hearts was estimated by Allen at 19·7 per cent.; Dr. Cowan and Dr. Faulds found it to be 17·7 per cent. when based upon Wassermann reactions of their patients, while if the diagnosis was based upon naked-eye pathological findings the incidence was 15·3 per cent. All these estimates probably erred upon the conservative side.

Pathological Lesions.

The pathological lesions recorded were those observed in a thousand consecutive necropsies; of these, 390 presented some disease of the heart or aorta, 60 of which were considered to be due to syphilis. The lesions found were endarteritis obliterans, aortitis, aortic valve disease, gumma, and myocardial fibrosis.

Endarteritis obliterans affected short lengths of vessel, but in their whole circumference, always narrowing the lumen and frequently accompanied by thrombosis. The interna and adventitia were always thickened and showed new-formed elastic tissue, the media being either thinned or little altered. Gross calcareous or fatty changes were rare. Prof. R. Muir held the opinion that the lesion represented the reaction to an irritant approaching the arterial wall from without. Endarteritis obliterans was characteristic of syphilis in all its stages, and was the important primary change in aneurysm and myocardial ischæmic fibrosis.

Specific Aortitis.—These lesions occurred as soft, gelatinous, greyish elevated plaques of considerable thickness, which might coalesce and later become contracted, thinned, and pearly white. The first part of the thoracic aorta was the site of election. The early lesions started in the adventitia and involved the nutrient arteries of the aortic wall, giving rise to weakening and resorption of the media with consequent weakening of the aortic wall. This process led to potential or actual aneurysm. The aortic cusps and the coronary vessels might be involved, but lesions of the mitral valve segments were insignificant and played no proportionate parts in the production of chronic mitral disease.

Aneurysm might possibly be produced by weakening of the aortic wall by ulcerative processes other than those of syphilis, but was most commonly of specific origin.

Chronic Aortic Valvular Disease.—The pathological lesions were admittedly very varied, the causes multiple, and the results upon the valve more dependent upon the site of the injury than on the cause. Valve lesions could take various forms, and their ætiology could not easily be determined.

Atheroma was by far the most common vascular lesion, peculiarly liable to attack vessels of the heart, brain, and limbs with the aorta. The causes were general, arising in the battle of life and accompanying increasing years. Atheroma is often present in addition to rheumatic and specific infections, making the resultant lesion impossible to classify.

Myocardial disease was mostly only a side issue. The occurrence of a true syphilitic myocarditis, or of localised gummata, was rare, the myocardial change being for the most part the secondary effects of coronary occlusion and, therefore, not in themselves specific, but dependent upon the degree of occlusion.

Pericarditis of syphilitic origin was hardly ever seen, though cases of proliferative mediastino-pericarditis, taking origin beneath the diaphragm, might occur.

The Clinical Data.

Aortitis of the infective type was chiefly caused by syphilis; the lesion per se produced no symptoms even when extensive in area and advanced in degree. Patients suffering from large aneurysms, extensive aortic valve lesions, and coronary infarcts were able still to carry on their employment. Although the symptoms of specific heart lesions were similar to those arising from any other cause, paroxysmal attacks of pain and dyspnœa at night were more common in the specific than the rheumatic group, owing to the coronary involvement. In the syphilitic group continued pain was suggestive of aneurysm rather than pericarditis; palpitation was due to throbbing vessels rather than to abnormal rhythm, and œdema to local pressure rather than the effect of gravity. The appearance of the patients was thin, emaciated, and sallow, abnormal pulsation sometimes appearing above or below the clavicles. A systolic aortic murmur often preceded a diastolic one, although aortic stenosis was rare; the second aortic sound was increased and the radiogram showed an increase in the aortic shadow.

The association of aneurysm with syphilis was stressed by Dr. Cowan and his collaborator; in a series of 66 cases of chronic aneurysm 49 were found to be syphilitic. The age-incidence both of syphilitic heart disease and of aneurysm was from 40 to 60; both tended to occur 10 to 20 years after infection, although cases had been recorded within 12 months of primary infection.

Chronic aortic valve disease was regarded as due to syphilis in 30 per cent. of a series of 274 cases; but there was a sex difference, the incidence being over 3 per cent. in males and under 20 per cent. in females, and also an age difference, the percentage rising to 5 between the ages of 40 and 60 in males. The incidence of syphilis and rheumatism in the series was the same, but the incidence of aortic disease in men between 40 and 60 with no antecedent history was very suggestive of a specific origin.

The physical signs differed little in the two groups; but accentuation of the pulmonary second sound, common in rheumatic cases, was rare in the syphilitic group, since rheumatism commonly, and syphilis rarely, affected the mitral cusps. Evidence of aortic aneurysm or dilatation of the aorta suggested a specific origin of the lesion, but the final diagnosis might frequently depend upon the recognition of stigmata elsewhere or a positive Wassermann reaction. Not only mitral valvular disease but acute endocarditis was rare in syphilis, while in the rheumatic group reinfection from acute endocarditis may occur and leave unmistakable signs at necropsy.

Myocardial Disease.—Examination of the series of cases failed to give any estimate of the frequency of syphilis as a causative factor in myocardial disease; the age-incidence was a decade later than that usual for syphilis. The conclusion arrived at was that the degree of coronary damage was a much more important factor than the original cause of the disease.

Angina.—The relation of syphilis to angina was discussed. The speakers considered the physiological basis of the pain to be the relative anoxæmia of the cardiac muscle. Seven necropsies were recorded in three of which specific aortitis was found. They pointed out, however, that the average age of incidence was a decade later than that for specific aortitis.

Diagnosis.

Dr. Cowan and Dr. Faulds said that the four great causes of cardiac lesions were rheumatism and bacterial endocarditis in the earlier years of life, involving the valves and pericardium, and syphilis and atheroma in later life, involving the valves and arteries. Syphilis must be recognised as an important cause of heart disease, occurring most frequently in males between 40 and 60, the symptoms being entirely cardiac. Aortitis and aneurysm were usually, aortic disease, myocardial disease, and angina frequently, syphilitic; mitral disease and pericarditis were never syphilitic.

The clinical history might mislead; the Wassermann reaction, if positive, was important, but if negative might mislead, since 25 per cent. of cases of syphilis might give a negative reaction in the tertiary stage, though a full routine examination might reveal other definitely specific stigmata to complete the diagnosis.

Treatment.

Treatment of cardiac lesions as such differed in no way from that of similar lesions of other origin. From the constitutional point of view, the disease was still active and required active treatment. The choice between the sterilisation by arsenical compounds and the older method of administering a long course of mercury and iodides must be made.

The speakers held that the older long-continued method was much to be preferred, except in those patients who showed no signs of cardiac deficiency; but they stated with emphasis that the true treatment of cardio-aortic syphilis was preventive, every case which occurred nowadays being due to error, either on the part of the patient or on that of his medical adviser.

Discussion.

Dr. S. BOYD CAMPBELL (Belfast) confined his remarks to the serum reactions in the blood in cases of cardio-aortic syphilis, with the changes resulting from treatment. Among 55 cases of aneurysm the Wassermann reaction was found negative in 11. Variations in the results were found by various techniques. The degree of positiveness was usually slight, while provocative N.A.B. injections rarely produced any change. A series of graphs were shown recording the positive units by the Dreyer method before, and during, treatment; several showed a considerable fall, in some cases to negative, followed by a slight rise. The records extended over varying periods up to four years. The method of dosage remained constant, small amounts of N.A.B. up to ·4 g. were given, accompanied by the continued exhibition of mercury and iodides. Another series of graphs showed a marked rise in the serum reaction as the result of the first course of treatment, followed subsequently by a fall almost to normal. Two cases were recorded where a superimposed bacterial infection in a treated case occasioned a sudden rise in reaction with death. Treatment had originally been undertaken in those cardiac patients who responded badly to treatment on general principles. They showed material improvement under antispecific treatment, but only if the first part of the treatment was carried out while the patient was confined to bed. Dr. Boyd Campbell believed that once treatment had begun it must be maintained for the rest of life, and that probably two courses per year would always be required.

Dr. J. CRIGHTON BRAMWELL (Manchester) confined his remarks to the disturbances of the cardiac mechanism. He said that it was difficult to find an adequate criterion of the syphilitic origin of a lesion. In premature ventricular contractions, for example, tea, coffee, tobacco were known to be capable of producing the arrhythmia in susceptible subjects. The presence of a positive Wassermann reaction proved nothing. Where groups of ventricular extrasystoles occurred and disappeared under antispecific treatment, the possibility of a syphilitic origin had to be considered. Paroxysmal tachycardia was known to be rare in cardio-aortic syphilis. Dr. Bramwell said that in 26 of his own cases where the nature of the arrhythmia had been established by the electrocardiogram no clinical evidence of syphilis had been obtained, and similar findings had been reported by other workers. Heart-block had in the past been regarded as most frequently due to syphilis, but increased knowledge had shown this to be wrong. In his own series of 23 cases clinical evidence of syphilis was found only three times, and these summed with other records in the literature gave 105 cases, with syphilis as a cause in 20. Heart-block of high grade, even causing Stokes-Adams attacks, might occur in paroxysms. There was on record a case where the heart was observed to change from normal rhythm to complete heart-block with convulsive seizures on two days out of eight, and then to return to normal rhythm. These attacks were attributed to a pyrexia with joint pains which occurred almost simultaneously. Auricular fibrillation arose from three main causes: (*a*) rheumatic infection of long standing; (*b*) degenerative myocardial fibrosis; (*c*) toxæmia as in thyroid disease. There was no evidence that syphilis was likely to be a common cause. Dr. Bramwell had come to the conclusion that heart-block was the only disturbance of cardiac mechanism which was frequently due to syphilis, the condition of pulsus alternans being common to all degenerative cardiac changes.

Prof. A. S. WARTHIN (Michigan) spoke of the histological findings in syphilis, particularly those in the heart muscle. He recalled the fact that cardiac myxo-gumma was first referred to in 1828, the observation remaining unnoticed until his own corroborative work many years later, when a similar condition was found in a congenitally syphilitic heart, and he was able to demonstrate large numbers of spirochætæ in the gelatinous areas scattered throughout the ventricular wall. Prof. Warthin showed a series of microphotographic lantern slides to demonstrate the histological changes of acute exacerbations of syphilis in the ventricular myocardium of two patients who died with dramatic suddenness; death in early life was due to congenital syphilis, and that in later life to the acquired disease—in both cases when the disease had existed for 20 years. Each series of slides was introduced by a short résumé of the clinical history; then slides of the macroscopic appearance were followed by those illustrating microscopical changes under progressive degrees of magnification up to the tissue reactions around the individual spirochæte. The yellowish, semitranslucent, gelatinous patches of the macroscopic lesion, the proliferation of all nuclei in the affected area, the multiplication of the single nuclear tissue cells, the intercellular œdema, the want of change in the majority of the muscle-fibres, the vacuolation and œdema of the connective tissue with proliferative thickening of the endocardium were clearly represented. Prof. Warthin stated that 20 to 60 per cent. of all post-mortem material at his hospital showed definite evidence of latent syphilis in which the spirochæte could be demonstrated. He pointed out that such lesions as had been shown could be found in the wall of the left ventricle at its junction with the septum in every male case of syphilis, but that this was not true of the female.

Dr. F. PARKES WEBER (London) asked Prof. Warthin what were the Wassermann reactions in his cases of syphilitic myocarditis, and also whether cases of thoracic aneurysm had been found due to any disease other than syphilis, particularly in young people. Aneurysms of cerebral vessels were known to give rise to sudden severe cerebral hæmorrhage before the age of 30.

Dr. J. SPEARES (Dublin) reported a high frequency of positive findings of aortic aneurysm by routine X ray examination of heart cases, having found thoracic aneurysm in 42 instances among 600 cardiacs, with vocal cord palsy in 13 instances. Among this group the Wassermann reaction was found to be negative 15 times. Tracheal tug as a

physical sign was criticised, the speaker only having found it present once in 61 cases of thoracic aneurysm. He considered the value of the Wassermann reaction in cases of myocardial damage to be very doubtful owing to the total want of correspondence between the clinical and pathological findings.

Dr. D. NABARRO (London) reported the occurrence of chorea and rheumatic heart disease in a child aged 8 at the Hospital for Sick Children, Great Ormond-street, who developed keratitis while under treatment. He was found to have Hutchinson teeth and a strongly positive Wassermann reaction, and under adequate antisyphilitic treatment made an almost complete recovery, including a negative Wassermann reaction.

Sir HUMPHRY ROLLESTON pointed out that the lesions found in the acute exacerbations of visceral syphilis were in their nature secondary rather than tertiary syphilitic phenomena. He asked how far to-day syphilis might be regarded as actually cured by modern treatment, in view of the continued record of reinfections.

Dr. H. J. STARLING (Norwich) discussed the indications for Wassermann test in heart disease. He considered that aortic valve lesions, pallor, wasting, and a grade of illness disproportionate to the lesions found, or a reluctance to recover, all called for this investigation. He reviewed the coexistence of syphilis with other infections, and the possibility of exacerbation from any active sepsis in the course of active antisyphilitic treatment.

Prof. JOHN HAY (Liverpool) criticised the discussion on the grounds that although syphilis might be the original cause of a cardiac lesion, yet the illness from which the patient suffered and for which treatment was sought was cardiac failure. It followed that to treat the antecedent syphilis might do harm rather than good, while to deal with the essential symptoms of circulatory insufficiency was the essential clinical demand. He suggested that a percentage of 30–60 of all hospital autopsies showing definite signs of syphilis was one three or four times greater than anything accepted as probable in this country. He asked Prof. Warthin for any possible explanation of this discrepancy and also for any data to estimate the cardiac reserve in that series of cases reported by him in which dramatically sudden death occurred and revealed at autopsy a widespread generalised syphilitic myocarditis.

Dr. G. J. LANGLEY (Manchester) reported the Wassermann results from cases in his own cardiac clinic. The only case of thoracic aneurysm occurring in the past ten years which gave a negative Wassermann test was found at post-mortem to have no aneurysm. Aortic disease constituted 12½ per cent. of all cardiac lesions. 42 per cent. were rheumatic and 35 per cent. syphilitic; 18 per cent. showed thoracic aneurysm. Myocardial degeneration, as shown by a form of electrocardiogram differing widely and grossly from normal, occurred 43 times, of which the Wassermann reaction was positive three times in 16 cases. In nine cases of complete bundle-branch block the Wassermann reaction was only partially positive in one, being negative in all the others. Dr. Langley did not, therefore, regard syphilis as being the usual cause of gross myocardial disease.

Prof. WARTHIN, in reply to various inquiries, stated that 40 years ago the State of Michigan as a lumber camp was infected with a peculiarly virulent type of syphilis, which might explain the very high percentage of findings at the autopsies of to-day. He reiterated his figures of 30-60 per cent. of syphilis for all hospital autopsies. He stated that even with the special Kahn test, much less with the ordinary Wassermann test, many results were negative in cases which later were proved histologically to be syphilitic; even in such diseases as thoracic aneurysm the Wassermann reaction and Kahn test were not uncommonly both quite negative. He discussed the distribution of syphilitic histological changes in the sexes. Syphilis was common in the testis, but was never found in the ovary; it was common in the heart, central nervous system, and aorta of man, but rare in woman. He further stated that syphilis tended to remain entirely latent in women till after the menopause, when acute exacerbations were common. His experience of actual cure was that it never occurred. Treatment must be maintained certainly for five years, and probably longer; immunity might be established, but probably not for all strains of the spirochæte. Reinfection so-called could be explained on two heads: (1) The second chancre was not a true chancre; in some cases he had demonstrated the absence of spirochætes, the lesion being septic in origin. (2) In other cases, the reinfection was due to another strain of the organism. He knew of only two causes for thoracic aneurysm: syphilis, and the *Streptococcus viridans* of bacterial endocarditis.

SECTION OF NEUROLOGY AND PSYCHOLOGICAL MEDICINE.

THE VOLUNTARY BOARDER.

Prof. JUDSON S. BURY (Manchester) presided over this Section.

Dr. HENRY YELLOWLEES (London) opened a discussion on the present position of the voluntary boarder. He said that there were three classes of "mental" institutions in this country: the county or borough establishments for rate-supported patients, the privately owned "licensed houses," and the registered mental hospitals. In addition to rate-aided patients, many of the county asylums could and did, admit paying patients at a low figure, but no patient could be admitted to these institutions unless he had been certified and a magistrate's order for his "detention" obtained. This was probably the greatest blot on our present lunacy administration. Only the licensed houses and the registered hospitals received voluntary boarders. A voluntary boarder was a person who entered the institution on his own request, and was free to leave it at 24 hours' notice, should he desire to do so. The all-important statement must be added that a voluntary boarder might only remain under care so long as he was definitely desirous of doing so and capable of expressing his desire. In other words, expressed willingness to remain was the sole criterion of a patient's suitability to stay in a mental hospital on a voluntary basis. A very profound degree of mental disturbance was quite compatible with a wish to remain under care, but in practice this was not considered. So long as the patient wished to stay in hospital he remained a voluntary boarder, and therefore a legally sane man, whatever his symptoms might be. Once let this willingness to remain falter, disappear, or fail to be expressed, and the patient must be certified as of unsound mind. There was no more pitiable *reductio ad absurdum* than this, that the deciding factor as to a person's legal sanity or insanity was simply whether or not he could express a desire to remain in hospital. It took for granted that the patient meant what he said, and would not say what he did not mean.

A more important question was that of the patient who, having entered a mental hospital of his own accord, became, owing to illness, incapable of expressing his wishes one way or another. It was this problem of the non-volitional case which had always been the centre of controversy, and had led to the familiar criticism that if a patient, fearing an acute mental attack, entered a mental hospital, he would not be permitted to remain when the very illness for which he sought care supervened, should it render him incapable of expressing his wishes. Also, it must be noted, that the cause of the patient's lack of volition had nothing whatever to do with the case. Should a patient suffering from the nervous and mental after-effects of, say, concussion, seek admission, and subsequently lapse into unconsciousness, there was not the faintest doubt that, as the law

tood, he ought to be either certified or removed. And if this was so, how much more was it true of onfused patients, of irritable, excited patients, of atients who were swayed hither and thither by onstantly varying delusional fancies, and of melan-holics whose entire loss of volition and querulous bjection to deciding anything were among their undamental symptoms? All such patients, and nany others, said the law, must be removed or ertified.

The Interpretation of the Law.

Our Lunacy Act said very little indeed about oluntary boarders. So far as it concerned itself vith them at all, it regarded them purely from the oint of view of the liberty of the subject. It looked n them as people who had taken the risk of jeopar-lising their personal liberty and must be safeguarded rom any unscrupulous persons who might attempt o take advantage of this fact. The conception of a oluntary boarder as a sick person seeking advice, reatment, and care in a medical establishment was ttterly foreign to the Act. The unenviable task of nterpreting and administering the law as to volun-ary boarders fell on the Board of Control, and, aking it all over, the result was such a reasonably road and common-sense interpretation that all con-erned had cause for thankfulness. The voluntary oarder had particular cause for gratitude. Among nany other things, the Board of Control did all it roperly could to avoid or postpone the certification or emoval of the non-volitional case. When there was any round for expecting return of volition in a reason-ble period a week or two's grace was usually granted, articularly when, as almost always happened, the elatives urgently desired it. Nevertheless, the non-olitional patient could not legally remain in a mental hospital. That was the crux of the whole natter; it was the problem which had so far proved nsoluble, and seemed likely to remain so until the ublic view of mental illness and its treatment had been completely re-educated and the law entirely ecast.

Alternatives to Certification.

Assuming that care and treatment at home were mpracticable, as they were in a majority of cases, here was no alternative to certification. There were, however, two other possibilities which might be egalised. First, it might be made legal to retain such a patient in a nursing home, "free from the taint of lunacy." Dr. Yellowlees mentioned this only to condemn it. To begin with, he said, why should the nursing home be given authority to retain certi-fiable patients without certificate when such authority was withheld from the mental hospital? Further, such a course would deprive the patient of what was incomparably the best means of treatment for him. There was no form of disposal for mild or severe mental cases to compare for one moment, as regards efficiency, economy, and results with residence in a modern mental hospital. The speaker had held that view when he was a medical superintendent. He held it equally firmly and expressed it more readily now that he was no longer engaged in institutional work. Secondly, it might be made legal to retain uncertified in the mental hospital a voluntary boarder who had become non-volitional. This was the ideal, but how it was to be contrived was hard to see. In the present state of public opinion, Dr. Yellowlees confessed he could imagine no workable system of "safeguards" which would be likely to meet with general acceptance. The best that the Royal Commission could suggest was an elaborate process of provisional certification. It was a clumsy sort of compromise which would have been unworkable, and in any case did not meet the difficulty. As things were, however, there was no alternative to certification if the voluntary boarder who had become non-volitional was to remain. One practical difficulty immediately presented itself. If the patient was certifiable, and his relatives wished him to remain where he was and were content that he be certified, was it fair to proceed with this and retain him as a certified patient? A majority of the public regarded it as a gross breach of faith in the case of a patient who wished to leave. Many mental hospitals went the length of refusing to keep as certified those who had been with them as voluntary boarders, and there was something in this as a gesture, though it was hard to see what principle was involved.

The process of certification should not be necessary, but it would remain so until we had provided a more satisfactory alternative, and, in particular, until we had solved the problem of the non-volitional case. That it was utterly distasteful to both the lay and medical public there was not the slightest doubt. A large majority of the public regarded avoidance of certification as the first and greatest consideration in mental illness. This was in many ways a pity. There was much to be said in favour of certification in many cases, even under the existing law, and most of the public horror of it was the result of ignorance and prejudice.

The Grading of Patients.

The dread of "asylums," as apart from the mere process of certification, was of course what affected the intending voluntary boarder, though to a much less degree, strangely enough, than it did the relatives of the certified patient. It was the old question of "grading" which was at the bottom of it all. The extraordinary variety in the symptoms and needs of the patients admitted to a central hospital of any size, along with the constant dead weight of irrecoverable chronic cases, presented a problem which needed —among many other things—almost unlimited space, staff, and money for its solution. For some years he had been convinced that this difficulty was being met in the wrong way—namely, by keeping mild cases away from the mental hospital, which, with all its drawbacks, was infinitely the best place for them. Dr. Yellowlees had long thought that we should begin at the other end, and remove to completely separate and independent branches of the mental hospital the chronic, unpleasant, and noisy cases. It would need more than two separate establishments to do the thing ideally, and, of course, the branches, though entirely separate, would have to be near enough for quick and easy interchange of patients. A scheme of the kind was actually in preparation in London just now, the pioneers being the Governors of St. Luke's Hospital. When completed, the reorganised St. Luke's would consist of three separate establishments, one in London and two near it—one of them for quiet, recent, coöperating patients; the second for noisy and troublesome acute cases and irrecoverable chronic ones; and the third for convalescents. He mentioned this scheme, not to discuss it, but to show what could be done and was being done in the face of quite extraordinary difficulties. It was to the general body of the profession that we might fairly look for help. There could be no better outlet for the organised activity of the profession and of the B.M.A. than a combined effort to bring just a little more science, broadened humanity, a little more practical good sense, into our dealings with sufferers from the saddest of all human ills.

Conditions in Scotland.

Prof. G. M. ROBERTSON (Edinburgh) said that while Dr. Yellowlees had restricted his observations on laws and practice to those prevailing in England, he (Prof. Robertson) proposed to supplement his remarks by an account of the laws and practice in Scotland. The experiment of treating patients suffering from mental disorders voluntarily was first tried in Scotland in 1862. The voluntary patients who were admitted to mental hospitals in Scotland under the 1862 Act were all of unsound mind, and any person could be admitted as a voluntary patient provided he made a written application to that effect. After admission to a mental hospital he might continue to enjoy the status of a voluntary

patient, so long as he lived and did not give "notice of his intention or desire to leave." As Scotland enjoyed such exceptional facilities in law for voluntary treatment, the number of voluntary admissions of this class was very large and far exceeded the number of those who were certified. There were two great differences between the English and Scottish lunacy laws relating to voluntary patients. (1) According to the strict interpretation of the English law, a person of unsound mind, one who could be certified, could not legally become a voluntary boarder; or, after he became one, could not remain so. In practice this law was not now strictly administered; nevertheless the legal difficulty existed and frequently created problems. No such difficulty existed in Scotland, and the question whether the voluntary patient was of sound or of unsound mind did not arise. One condition only need be fulfilled for becoming a voluntary patient in Scotland—namely, a written application expressing a desire to submit to treatment. The presence or absence of sanity was not a condition. (2) A voluntary boarder might only remain as such in England so long as he was definitely desirous of remaining so. In Scotland there was only one condition that normally put an end to the status of a voluntary patient and that was when the patient himself gave "notice of his intention or desire to leave."

The problem of the non-volitional case was twofold: first, it concerned the case already in a mental hospital as a voluntary boarder, and, secondly, the case at home not yet placed in a hospital. In the first place a voluntary boarder who had become non-volitional could not remain as such in a mental hospital in England. In Scotland he could, so long as no notice of his intention or desire to leave had been given. As the question of the soundness or unsoundness of mind of a voluntary patient did not arise in Scotland, the problem of the non-volitional case was so far simplified. In the second place, Dr. Yellowlees had discussed the question of the disposal of those non-volitional cases not yet placed in mental hospitals, and who could not be cared for and treated at home. He had stated that for these cases "there is no alternative to certification." For over 80 years it had been legal in Scotland to treat a patient suffering from mental disorder, with a view to his recovery, in any house or home, without certifying him to be insane. The authority for this was the well-known "Schedule G." and its provisions had been more or less closely followed in Bill after Bill for England, none of which had, however, passed into Acts. Dr. Yellowlees had mentioned treatment in a nursing home "only to condemn it," and Prof. Robertson agreed, provided he referred to *ordinary* nursing homes in England. A very different situation, however, existed in Scotland, where a public corporation, with a disinterested board of managers and with unbounded resources, provided *special* nursing homes for mental patients. Prof. Robertson considered that at present such nursing homes were the very last word in the treatment of non-volitional cases of mental disease, without certification. As an example, the managers of the Royal Edinburgh Hospital at Morningside had established six associated nursing homes for nervous and mental patients. These admitted about 150 patients a year, and the demand for admission from all parts of Great Britain was so great that all these homes were full and three more were about to be opened. There was reason to be thankful for the advantages enjoyed in Scotland in the voluntary treatment of private patients, but the treatment of the poor had not kept pace with this progress. There had been legal difficulties in the way, just as there were at present in England. By the repeal of the provisions of Section 64 of the 1913 Lunacy Act (the Local Government (Scotland) Act) these legal difficulties had been swept away, and there was nothing now to prevent the rate-aided poor from enjoying in the future all the advantages of voluntary treatment that the rich had enjoyed in the past.

Discussion.

Sir HUBERT BOND (London) considered that muc confusion had arisen concerning the subject of th voluntary boarder largely owing to (*a*) the erroneou manner in which the term "voluntary" had bee employed (it was often used as meaning early, mild or recoverable, and was applied to such cases) (*b*) the continued application of the term "boarder which was entirely misleading. Originally and in th Act, this term was only used for (1) those patient who had previously been under certificate, and wh desired to re-enter the hospital on a voluntary basis and (2) the relatives of patients who desired to boar in the same hospital. The speaker did not regar with favour the terms "involuntary" and "non volitional" as applied to patients; moreover, th public did not understand them. According to thei attitude to treatment, Sir Hubert Bond woul prefer to divide patients into three classes: (1) willing (2) indifferent, and (3) unwilling. Changes in th present legal position were certainly desirable, bu he considered that it was impossible to do withou certification. He hoped it would be retained especi ally for those cases who were unable to perceive tha they were mentally ill, and also for the protection o individuals brought into contact with those ofte hostile and dangerous cases—the "unwilling" class

Dr. E. MAPOTHER (London) considered that th Board of Control had persistently obstructed an restricted "voluntary" treatment. The law in per mitting this for the recurrent case had obviously intended permission to continue when certifiable The Board had not only insisted on certificatio when possible in the recurrent case, but oppose voluntary treatment in all but the recurrent case In his (the speaker's) view there was nothing in th law to prevent continued treatment as voluntar boarders of either certifiable or non-volitional patients This view was strengthened by the fact that such régime had been approved by the Board and in forc for six years at the Maudsley Hospital. Elsewher the Board was slowly being forced by the pressur of outside opinion into action upon the two principles (1) that the sole criterion of fitness to be a voluntar boarder was willingness, and (2) the sole criterio of willingness was the last expressed wish of th patient. The moral was that before the essentia changes in the law (such as financial provision fo voluntary patients in public hospitals) a change bot in the policy and personnel of the Board of Contro was necessary.

Dr. HELEN BOYLE (Brighton) said that there wa every reason to be profoundly dissatisfied with th present position of voluntary boarders. Provisio in this respect was made only for the well-to-do; fo the poor the status of a voluntary boarder wa unattainable. It was a matter for urgent improv ment. For 25 years various promises had bee made for the acceptance of voluntary boarders i county asylums, but nothing had yet been done.

Dr. R. EAGER (Exeter) said that he had no person experience of voluntary boarders since he was i charge of a county mental hospital from which suc patients were excluded in the present state of th lunacy laws. It was surely time these laws wer altered so as to allow the same facilities to the rat supported as now pertained only to private patient When the Lunacy Act was framed in 1890 it wa evident that the sole idea in the minds of those wh drew it up was one of detention to guard the patien from ill-treatment and to protect the public fro homicidal attacks and other risks of disturbanc The idea of treatment was not to be gathered fro reading the Act; it was quite time for somethin to be done to make the law in this matter meet mode progress. Dr. Eager had had patients obvious suffering from symptoms of early mental disord come to him and ask for admission and had had refuse them and to tell them. Also, the fact w that they had to wait until their symptoms had increased as to be easily recognised not only by th

ractitioner but by a magistrate who need not be a edical man. He hoped that some alterations would on be made to right the wrong.

Dr. W. A. POTTS (Birmingham) in dealing with ie question why the mental case could not be rtified and removed to hospital in the same way a case of infectious disease, considered that not ly the public but also the medical profession eeded more education on the subject. His experi- ice was the majority of nervous and early mental ses had been told either that there was nothing rong with them, or that their condition was due to eir own fault in worrying and having silly ideas. stead the patient should be told that he was ffering either from some chronic infection, or, if orough investigation disproved this, from a mental nflict which was not his fault but the consequence an unsatisfactory environment—past or present.

Colonel F. E. FREMANTLE, M.P., said that he was ite sure that there was not a single Member of arliament who did not sympathise with the diffi- lties regarding voluntary boarders and early ental cases. It was essential it should be brought ore to the notice of the public and also to that of eir representatives in Parliament. Medical men eeded to impress the necessity for lunacy reform on wyers and on Members of Parliament. It was ssential to try to get the Government to include the ecessary legislation as part of their programme.

Dr. C. A. MORTLOCK-BROWN (Braunton) pointed ut that if a patient was under certificate the petitioner ad right of access to him and could not be refused; hereas no relative or friend of a voluntary boarder ad any such right. Patients designated "non-olitional" and "involuntary" would also be eprived of this form of protection if they were not rtified. She considered that the present legal assification of "certifiable" and "non-certi- able" was a more or less practical working ie. With regard to classing patients as "voluntary" nd "non-volitional" or "quiet" and "noisy," would be no easier to say if a patient on ie following day would be willing or noisy than was now to decide whether he would be certi- able. She desired to appeal for the appointment of vo medical women commissioners to the Board of ontrol.

SECTION OF DISEASES OF CHILDREN.

TONSILS AND ADENOIDS.

With Mr. T. TWISTINGTON HIGGINS (London) in the ie chair, a discussion on tonsils and adenoids in eir medical and surgical aspects was introduced by Ir. J. ARNOLD JONES (Manchester), who said that ere was no medical topic which the laity of these lands discussed with more frequency, more verve, nd more ignorance. The function of the tonsils was ill in dispute, but it seemed most reasonable to gard them as organs for the defence of the respira- ry and digestive tracts during the early years of ildhood. When a tonsil became chronically hyper- ophied or diseased it lost its defensive powers and me to resemble a choked filter. This was borne ut by the greater frequency with which children ossessing such tonsils contracted infectious diseases, nd the severity of the ear and throat complications such cases.

Adenoids.

When the pharyngeal tonsil became hypertrophied nd gave rise to definite symptoms adenoids, or denoid vegetations, were said to be present. Whilst ie cause of this hypertrophy was unknown it was ost probably due to a lowered vital resistance and n exciting or local cause, such as catarrhal attacks r infectious fevers. Adenoids were most common etween the ages of 3 and 14 years, but might be resent at birth and not infrequently produced mptoms during the first year of life.

The *symptoms* of adenoids could be classified into ur groups: (1) Nasal obstruction, often accom- panied by a muco-purulent or purulent discharge. Here the classical picture, open mouth, rabbit teeth, noisy respiration, and the so-called adenoid facies, &c., was often encountered. (2) Secondary affections. The most common and most important secondary affection was aural, with consequent deafness, sup- puration, and other sequelæ. Other affections were chronic cervical adenitis, defective pulmonary expansion, chronic bronchitis, and gastro-intestinal catarrh. (3) Reflex neuroses. Under this heading came enuresis, night terrors, and twitchings. In asthma the adenoids should always be removed if present, and also in chorea, laryngitis, stammering, and convulsions. (4) Constitutional changes. These might be physical or mental.

The *diagnosis* was usually easy. Posterior rhino- scopy was preferable to palpation with the index- finger as this procedure often upset the patient. In the presence of diseased adenoids surgical removal was the only *treatment*. For this purpose StClair Thomson's cage curette was the best instrument. Immediate hæmorrhage after operation was usually very brisk, but as a rule ceased within a few minutes. True secondary hæmorrhage was rare, and the speaker had only had two instances in over 12,000 cases. There was no doubt that adenoids could recur after efficient removal.

Tonsils.

The indications for tonsillectomy given by Mr. Jones were: (1) Any interference, night or day, with respiration or with speech. (2) Chronic enlargement of the cervical glands, which might be due either to chronic sepsis of the tonsils or tuberculosis. (3) Recurrent sore-throats due to frequent attacks of tonsillar inflammation or peritonsillar abscess. (4) Systemic infections attributable to a focus in the tonsil, such as rheumatism, chronic ill-health, and occasionally a rare toxæmia. (5) Chronic lacunar tonsillitis. (6) In diphtheria "carriers," when the infection was persistent.

The size of a tonsil was no guide to the degree of sepsis; indeed, small tonsils were often the worst offenders. Two important diagnostic points were the demonstration of pus in the tonsil by pressure with a tongue spatula, and enlargement of the glands at the angle of the jaw. Mr. Jones did not think that in those cases where an operation for the removal of adenoids was necessary the tonsils should also be removed as a routine measure.

Of the two methods of tonsillectomy in use—namely, the guillotine and dissection—he was quite convinced that in expert hands the former was the safer, being, as a rule, a much shorter operation and equally efficient. Dissection required deep anæsthesia and this made it a major operation. The ultimate results of the dissection method were no better than those of the guillotine. In efficient hands complete enucleation could be accomplished by either method; with an inefficient operator either method might fail. The guillotine Mr. Jones preferred was Heath's, but he had also recently tried the Popper-Heath modifi- cation with every satisfaction. After the operation bleeding was usually brisk for 30 to 60 seconds and then ceased spontaneously. If the bleeding continued, pressure, hydrogen peroxide, or adrenalin might be used, but it was very rarely necessary to apply a ligature.

Where the tonsils were efficiently enucleated the results were excellent as regards all the indications for operation he had enumerated, except chronic enlargement of cervical glands and systemic infections. In those cases in which a cure was not obtained it would be found that tonsillar tissue had been left behind.

Discussion.

Dr. T. A. GOODFELLOW (Manchester) spoke from the point of view of the general practitioner, to whom, he said, the rôle of diseased tonsils and adenoids in childhood was of daily concern. The acute cases of tonsillitis were of almost greater importance than the chronic cases as, by proper treatment, dire after-

results in later childhood and puberty could be prevented. Whilst the diagnosis of adenoids might be easy in the hands of the expert there were a large number of cases where the mass of adenoid tissue removed at operation was out of all proportion to the symptoms present. Hence their removal was important in every suspected case. The conditions in the patient calling for the services of the expert were: mouth-breathing, respiratory catarrhs, all aural conditions from deafness to otitis media, recurrent and persistent febrile attacks with no other cause, and a familial tendency to adenoids which was notable especially among Jews. The diagnosis of tonsillar enlargement was usually easy; the difficulty was to know when to operate and when not to operate. Local medicinal treatment could do much good in some cases; it might lead to a fibrosis of the tonsillar tissue analogous to that occurring normally at 14 to 16 years of age. If, after one attack treated medically, there was one relapse, then the tonsils should be removed. In conclusion, Dr. Goodfellow spoke strongly against the (in his opinion) almost unjustifiable removal of tonsils and adenoids in the out-patient departments of hospitals, and condemned the practice of allowing children to go home a few hours after operation.

Miss GERTRUDE HERZFELD (Edinburgh), speaking as a general surgeon, said she was interested in the relationship of tuberculous cervical glands to tonsils and adenoids. During the last five years 646 cases of cervical gland tuberculosis had been dealt with by radical operation at the Edinburgh Children's Hospital. In a large number of these the tonsils appeared healthy and not enlarged, and therefore they must have failed in their protective function. The tonsils had been examined histologically in her last 17 cases, and in 9 of them signs of early tuberculous infection were present. Cervical tuberculous glands, she said, very rarely appeared after tonsillectomy for simple hypertrophy, so that this operation at an early age might prevent the development of such infection in later childhood. Other children who required tonsillectomy were those with simple enlargement of the cervical glands, those who had had pneumococcal or other infections which might reach the blood stream through the tonsils, and those who suffered from general weakness and hypotonia, as shown, for instance, by flat-feet. The diagnosis of adenoids was not always simple. The possibility of a retropharyngeal abscess should always be borne in mind, and digital examination carried out in all doubtful cases, especially those of short duration. In Miss Herzfeld's opinion skilful removal of the tonsils with the guillotine was the best method of tonsillectomy.

Dr. DAVID NABARRO (London) gave the result of some investigations carried out by Dr. R. A. Macdonald and himself. The organism of rheumatism was often said to be found in the tonsils. They examined bacteriologically the streptococcal flora in 50 tonsils removed from rheumatic children and 48 from non-rheumatic patients. Whilst admitting that the classification of streptococci was not yet very satisfactory they did not find any marked difference in the streptococcal flora of the two groups; in other words, the rheumatic cases could not be told from the non-rheumatic ones. Although tonsillectomy was of value in acute rheumatism the causal streptococcus had not yet been established. The considerable difference of opinion amongst investigators made it very difficult to correlate their findings. It was probable that the soil was more important than the seed and hypersensitiveness to streptococci might be the cause. The tonsils might well be the place where repeated small doses of infection occurred giving rise to this hypersensitiveness. Thus tonsillectomy in rheumatic cases was probably a valuable therapeutic and prophylactic measure.

Dr. JEFFREY RAMSAY (Blackburn) said that infected tonsils were a potential or actual source of danger to their owners. Sometimes it was hard to say whether the tonsils were infected or not, and it was in such cases that tonsil puncture, devised by Dr. C. M. Pearce and himself, was most useful. He described the details of his method and pointed out that both tonsils should be examined, since one might be healthy and the other diseased. In over 60 per cent. of cases he was able to obtain streptococci in culture. Hence the method was of value for the detection of these cases, and by the removal of these tonsils rheumatism could be prevented. Tonsil puncture was valuable, too, in the detection of cases of diphtheria "carriers." He quoted one case where a swab from the surface of the tonsil yielded but a feeble growth of diphtheria bacilli, yet tonsil puncture showed the presence of very virulent organisms.

Dr. F. C. EVE (Hull) demonstrated his method of tonsil suction by means of his simple instrument. By suction the tonsil could be turned inside out and the pus obtained could be shown to the patient. He also showed another instrument, for therapeutic use by means of which, he claimed, the tonsillar crypts could be cleared out and disinfected. Tonsillectomy was admittedly the better treatment, but was often out of the question, especially in adults. If septic tonsils were cleaned out by a course of suction before enucleation the danger of hæmorrhage could be minimised. His simple instruments afforded the general practitioner an opportunity, diagnostic and therapeutic, which was not available to him before.

Mr. DENNIS BROWNE (London) doubted if the tonsil had any defensive mechanism. Further, it was not possible to say whether nasal catarrh was due to adenoids or caused the adenoids, or whether both were due to a common cause. Turning to the choice of operation for the removal of tonsils he insisted most strenuously that the method of dissection was superior in every way to the guillotine.

Mr. F. H. DIGGLE (Manchester) advised against digital examination of adenoids because it frightened the children, and said that in his experience, too, adenoids did recur after efficient operation. Tonsils and adenoids might subside with efficient nasal hygiene and never recur, though nasal drill and hygiene in his hospital practice had not had beneficial results. Mr. Diggle used both the method of dissection and the guillotine. Even after complete removal of the tonsils freedom from further sore throats could not be guaranteed.

Dr. H. BRACEY (Warwick) spoke from the point of view of the school medical officer. Slight rickets, a bad stance, flat feet, and a general flabbiness of the body and even some flabbiness of the mind might result from diseased tonsils and adenoids. He asked Mr. Jones if he had met with cases of adenoids in which the only symptom was headache.

Dr. ESTHER CARLING (Berkshire) said that she had charge of a small sanatorium for potentially tuberculous children. Many of them suffered from diseased tonsils, and in her experience the improvement obtained after removal of the tonsils and adenoids was very gratifying. There was no doubt that many children were labelled as suffering from suspected tuberculosis when they were really suffering from tonsils and adenoids. Dr. Carling joined with Dr. Goodfellow in declaiming against the practice of removing tonsils and adenoids in the out-patient departments of the hospital, with early despatch home.

Dr. C. P. LAPAGE (Manchester) expressed his belief that tonsils and flat feet were associated, the flat feet resulting from the hypotonicity consequent upon the toxæmia occasioned by the tonsillar sepsis. In heart disease, too, there was a condition of toxæmia, and it was not wise to refer to such cases under the term of chronic rheumatism. Post-operative general medical measures and nasal hygiene were matters of considerable importance.

Dr. H. T. ASHLEY (Manchester) said that all tonsils and adenoids did not require removal, though in suitable cases there was no more important operation. The incidence of sore-throats in a small rheumatic clinic under his charge was very high although nearly all the children had had their tonsils removed.

Prof. C. W. VINING (Leeds) after enumerating the diseases in which he considered removal of tonsils beneficial, said that in rheumatism the operation had no considerable value. Removal of the adenoids did not prevent chorea. In asthma, enuresis, glandular fever, tuberculous glands, or recurrent pneumonia he had not seen benefit from tonsillectomy. He decried the present tendency for the wholesale removal of tonsils and adenoids in school-children.

Dr. S. STEPHENSON put in a strong plea against children going home soon after operation at the hospital out-patient department, and after Mr. ARNOLD JONES had briefly replied to the discussion, a resolution was passed by the meeting to the effect that removal of tonsils and adenoids in children should not be done as an out-patient operation, and that provision should be made for them to be kept under observation for at least 48 hours.

Reviews and Notices of Books.

CAUSES AND PREVENTION OF MATERNAL MORTALITY.
By HENRY JELLETT, B.A., M.D. Dub., F.R.C.P.I., Consulting Obstetrician to the Ministry of Health, New Zealand; Consulting Gynæcologist, Rotunda Hospital, Dublin; late Master, Rotunda Hospital. London: J. and A. Churchill. 1929. Pp. 300. 15*s*.

THIS book is a contribution towards the reduction of the rate of maternal mortality. The views expressed are based upon the author's experience as Master of Rotunda Hospital and in the practice and teaching of obstetrics and gynæcology in Dublin as well as on that gained in his present position of consulting obstetrician to the Department of Health, New Zealand, where he is attempting to tackle the problem of the high maternal mortality-rate in New Zealand.

In this volume Dr. Jellett deals amongst other related subjects with the care of the pregnant woman, the education of the maternity nurse and midwife and of the medical adviser, the equipment of the private maternity hospital, and the general management of labour and the puerperium. Interesting, and to British readers, unflattering comparisons are made between the training of medical students in certain continental countries, especially Holland, and that in the medical schools of Great Britain and Ireland. In the University of Utrecht, for example, where the length of the medical course is six years, instruction in theoretical midwifery begins in the second year and continues during the third, fourth, fifth, and sixth. By the end of the fourth year the student has already had over 500 hours teaching in theoretical midwifery! In the fifth and sixth years the teaching is mainly clinical, but still eight hours weekly are, in addition, devoted to special instruction in practical obstetrics. In Amsterdam University "the number of teaching hours in obstetrics is equal to that in general surgery." Is it a coincidence that the maternal mortality-rate in the British Empire, including New Zealand and Australia, is 4·22, whereas in the Scandinavian countries and Holland it is only 2·53 per 1000 live births? Dr. Jellett believes that no scheme will go far towards reducing maternal mortality in this country until midwifery is allotted in the medical curriculum a place at least equal to that of surgery, but that when the training of the doctor is adequate, a scheme in which antenatal supervision is carried out by the doctor and normal labours are conducted by the midwife, with the medical practitioner, specialist, and hospital facilities available when necessary, will go far to solve our high maternal mortality-rate. The doctor he considers an unsafe accoucheur for normal cases, first, because he is liable to carry infection, and secondly because he is liable to be in a hurry, and therefore the two essentials of midwifery—asepsis and the avoidance of interference—are crowded out. The reader may well ask how the general practitioner is to acquire special skill if he only sees abnormal cases, or how he is to be rendered safe for abnormal cases if his contact with infected wounds in practice is liable to cause him to infect cases that are normal. Clearly the patient whose labour turns out to be abnormal is doubly unfortunate.

Referring to the methods of Dr. I. W. Potter (of Buffalo, not of New York) à propos of unnecessary interference with labour, Dr. Jellett states that in every case he "dilates the cervix manually shortly after labour begins, turns the normal vertex presentation into an abnormal foot or feet presentation, and extracts the child." In fairness to Dr. Potter it should be stated that he does not interfere until the os is fully dilated. In a final chapter on the causes and prevention of maternal mortality Dr. Jellett sums up what he believes to be the essential points to which future effect must be directed—viz., efficient medical education in obstetrics, efficient training of midwives and maternity nurses, the improvement of maternity hospitals, the general recognition of the facts that labour must be carried out under aseptic conditions, and that it is not permissible to interfere with normal labour, and, finally, antenatal supervision and care. In the latter it is essential that "the patient should find a sympathetic atmosphere in order that she may learn to view the clinic as an advisory centre where her various troubles are always willingly considered."

The book is written in vigorous style, and deserves to be read by all who are interested in an improved midwifery service.

EPIDEMIOLOGY OLD AND NEW.
By Sir WILLIAM HAMER, M.A., M.D., F.R.C.P., formerly Medical Officer of Health and School Medical Officer, County of London. London: Kegan Paul, Trench, Trübner and Co., Ltd. Pp. 180. 9*s*.

IN this book Sir William Hamer has brought together the views on epidemiology which he has so often expressed in the annual reports of the L.C.C. and in contributions to the proceedings of learned societies. Those who are familiar with the work will probably agree that the title might well have been "Old Epidemiology Rediscovered," for, although the author reveals by casual reference his familiarity with the work of the newer epidemiologists, the main trend of the argument is toward showing that Sydenham had got hold of most of the truth and that the particularism of the nineteenth century closed our eyes to the fundamental immutability of the laws governing the rise and fall of epidemics. Repeatedly, therefore, attention is directed to the remarkable similarity of the "epidemic constitutions" at the end of the seventeenth century and the "settings" of influenza in our own times.

The book opens with a review of epidemiological thought from Sydenham to to-day. Chapters follow upon the recent influenzas, contrasts and resemblances between the epidemics in London of Sydenham's time and the present day, the germ theory, and a plea for return to the Hippocratic method. Historically, influenza is shown to be an endemic disease with periods of violent epidemic exacerbation preceded and followed by outbreaks of fever with local manifestations in the cerebro-spinal system. It is maintained that these "settings" are so constant that the variants, influenza, cerebro-spinal fever, polioencephalitis, and poliomyelitis and lethargic encephalitis ought not to be regarded as separate, specific diseases. Sir William seems to have little faith in the theory that the micro-organisms hitherto identified are the main cause of the communicable diseases, preferring to describe them rather as "associated organisms," but he gives no valid explanation of the constant relation of a definitely recognisable micro-organism such as the meningococcus with a definite

clinical entity such as cerebro-spinal fever. While his broad generalisations will be hard to refute, his attitude to bacteriology is surely too iconoclastic. There may be a middle view. It is conceivable that, just as vaccinia may predispose to an infection causing encephalitis, the diseases known as cerebro-spinal fever, poliomyelitis, and epidemic encephalitis may become prevalent as the result of a symbiotic association of the micro-organism concerned with the virus of influenza in some particular phase of its life-history. Moreover, the modern theory of the epidemic could not have been formulated without investigation which depended upon knowledge arrived at primarily by laboratory methods. It is true, however, that the obsession of the professional mind with micro-organisms made it difficult for a small band of epidemiologists in the latter half of the nineteenth century to keep their confrères alive to broad epidemiological conceptions such as those of Sydenham, and we owe a debt of gratitude to men like Creighton and Hamer for reminding us of the things which had been noted about the behaviour of "fevers" before recognition of their specificity had blinded us to their temporal and local associations with one another.

This book, packed with references as it is, is indispensable to everyone whose interest in epidemics, and especially those of influenza, extends beyond their immediate clinical manifestations.

ULTRA-VIOLET THERAPY.

Les rayons ultra-violets en thérapeutique. Second edition. Par Dr. J. SAIDMAN *et associés.* Paris: Gaston Doin. 1929. Pp. 840. Fr.100.

Dr. J. Saidman has entirely rewritten his original text-book on actinotherapy, greatly enlarged it and brought every section well up to date. The book is divided into technical, physiological (including physical and chemical) and therapeutic sections. All are well documented and clearly written and contain summaries of the most important work in every field of the subject. The vague theories and assumptions frequently found in text-books on actinotherapy are fortunately absent. The author's own experiments are quoted, especially his researches with monochromatic light at the Institute of Actinology in Paris, and recent English and German work is reviewed very fairly. The therapeutic section is distinguished by a sanity of outlook rare among enthusiastic exponents of ray therapy. There are few statements at which one could cavil. The section on pulmonary tuberculosis is perhaps the least satisfactory, since the dangers of irradiating patients with early spreading lesions is not sufficiently stressed. This is one of the few conditions with which we are acquainted in which light treatment can do serious harm and if it is used at all it should be only by those who combine sound knowledge of actino-therapeutic technique with wide clinical experience of phthisical patients. Dr. Saidman's book would gain in value if some of the sections were further condensed, for the reader with little leisure is liable to be put off by verbosity.

JOURNALS.

JOURNAL OF PATHOLOGY AND BACTERIOLOGY. Vol. XXXII., No. 3. Pp. 349–716. July, 1929.—Further observations on the nature of bacterial resistance to bacteriophage, by F. M. Burnet (Melbourne). Bacteriophage resistant strains do not necessarily change their phase (smooth or rough) in becoming resistant; they may be serologically identical with the parent strain.—An investigation of the serological relationships of 26 strains of pasteurella, by J. T. Cornelius (London). The serological groups into which a majority of the strains fall show no relationship to the animals from which they were derived.—The histogeny of teratomata, by G. W. de P. Nicholson (London). A teratoma is not homologous with an embryo; it is the result of self-differentiation of totipotent cells with the coördinating influences of an individual.—The pathological action of light, by A. G. Levy (London). On the mouse's skin, the actions of visible light in mice sensitised with hæmatoporphyrin are the same as those of ultra-violet light on ordinary animals. Stasis is produced in the vessels with exudation of plasma and subsequent necrosis; there is also hypertrophy of the epidermis.—Animal strains of hæmolytic streptococci, by J. Smith (Aberdeen). Strains from cows, horses, and guinea-pigs cannot be distinguished from human strains.—Æsculin fermentation and hæmolysis by enterococci, by C. Weatherall and J. H. Dible (London). Ability to grow in bile media and ferment æsculin are useful characters.—The influence of dilution on the carcinogenic effect of tar, by I. Hieger (London). Undiluted tar was not more effective than a 10 per cent. solution in benzene; 1 per cent. was much less active than 10 per cent.—The modifying influence of dichlorethyl-sulphide on the induction of tumours in mice by tar, by I. Berenblum (Leeds). A trace of mustard gas prevents tar from producing tumours by its action on the skin.—The significance of coccal organisms in experimental poliomyelitis, by R. W. Fairbrother (London). The cocci found by various observers in infantile paralysis are either air contaminations of cultures or terminal invaders.—The histology of experimental poliomyelitis, by E. W. Hurst (London). The disease is an inflammation of the whole nervous system with special involvement of the anterior horn cells which are directly poisoned by the virus. Microglia plays an important part in the cellular reaction.—Red cell diameters in 100 healthy persons and in pernicious anæmia: the effect of liver treatment, by C. Price-Jones (London). The healthy mean diameter ranges from 6·7 to 7·7 μ with a mean of 7·2. An excessive variability of diameter is even more characteristic of pernicious anæmia than a high mean diameter. Liver treatment, effective in curing the anæmia, brings the red cells towards, but not always quite up to, the normal level.—A statistical study of cholelithiasis, by D. M. B. Gross (Leeds). Local disturbances of an inflammatory kind are mainly responsible for faceted stones, general metabolic factors (diabetes, atheroma) for the solitary cholesterol stone.—The action of a cytotoxic antiserum on tissue cultures, by J. S. F. Niven (Glasgow). An anti-embryo serum kills normal kidney, liver, or intestine, mouse cancer and fibroblasts, macrophages, &c. When powerful, it inhibits subsequent autolysis.—The nature of the lesions in generalised vaccinia in rabbits, by J. McIntosh and R. W. Scarff (London). The yare due to the specific virus and not to the activation of a latent infection with—e.g., pasteurella.—Innervation of human cancers, by H. Oertel (Montreal). By a modified silver method the author finds appearances which he interprets as a nervous organisation forming an integral part of cancers.—The effect of inhibition of connective tissue growth by means of substances present in tissue extracts, by T. B. Heaton (Oxford). This paper receives comment on p. 342.—Intravitam and supravital staining, by D. F. Cappell (Glasgow). A comprehensive account of the dyes used and their effects; just how cells stain depends on their state of functional activity at the moment. The reticulo-endothelial apparatus is considered in detail and the author concludes that the dust cells of the lung are epithelial in origin.—Books received.—Proceedings of the Society.—The fragility test in cases of jaundice, by W. T. Hillier (Birmingham). Best applied quantitatively.—Growth and reproduction of *B. tuberculosis*, by A. D. Gardner (Oxford). Follows ordinary lines; no evidence of any complex life-cycle.

NEW WARD OF EVESHAM HOSPITAL.—A 14-bed ward for men has just been added to Evesham Hospital and named "The Burlingham Ward" in recognition of the services rendered to the institution by the family of that name during the 50 years of its existence. Mr. Charles Burlingham, who was present at the opening ceremony, became secretary when the hospital was opened.

THE LANCET.

LONDON: SATURDAY, AUGUST 17, 1929.

A YEAR'S WORK IN THE MINISTRY OF HEALTH.

THE annual report of the Ministry of Health (1928-29) contains as usual an account of activities, many of which have a distinct medical bearing, although the report of the Chief Medical Officer of the Department is published in a separate volume. The record of the Ministry was, of course, prepared before the present Government had taken office. It deals with the more important business transacted by the Department during the twelve months, but does not cover matters of routine or detail, while the reports by the general inspectors on the administration of the poor-law during the year are omitted, because these are published separately with a reprint of the section in the main Report which deals with the subject.

A policy of continuity has been recently the marked feature of the health and sanitary legislation of this country, and the fact emerges immediately from this Report. Ten years ago, during the passage through Parliament of the Ministry of Health Act, it became obvious that there should be an overhaul of the system responsible for any direct health service to the country. The Local Government Act of 1929 is directed to the provision of remedies which have been found necessary during the ten years which have elapsed since the establishment of a single department of Government responsible for the supervision of the public health—i.e., the Ministry of Health. A prominent defect in the older pattern of organisation was constituted by the special areas which fell to the control of boards of guardians, whose duties as separate and independent authorities overlapped the duties of public health authorities in many directions. As far as medicine is concerned the responsibility placed upon the guardians to supply medical and surgical relief for the destitute was in many ways a reduplication of effort and a source of endless inefficiency. Before the Ministry of Health came into existence this anomaly had been pointed out and definitely recognised by successive Governments since 1917, and at last the administrative and financial arguments for the change have prevailed—in the words of the Report "what was then desirable has since become necessary and inevitable by the narrowing of rateable resources." The National Health Insurance Act, 1928, based on the recommendations of the Majority Report of the Royal Commission, has made many improvements of detail which have necessitated a considerable number of orders and regulations. But the essential scheme remains as at first laid down, when it represented the policy of continuity by its recognition, as a State measure, of the efforts previously made by individual members of the medical profession to furnish medical attendance on a coöperative basis for those of the public whose means did not allow of their undertaking the separate responsibility of payment. How the medical efforts were exploited by lay companies is an old story, but the National Insurance Act, in its original shape, killed the gross abuses. For the most part the new provisions came into operation on Jan. 1st, 1929, and are referred to in many parts of the Report, which makes valuable reading for all who would understand the working of the Insurance Medical Service.

The extent of that Service in 1928 gives figures to be noted. In England alone 14,300 doctors were during last year in insurance practice, while medicines and appliances were being supplied as part of medical benefit at some 9000 shops of pharmaceutical chemists. As the number of insured persons entitled to medical benefit, an analysis of whose claims appears in an earlier section of the Report, was about 13,900,000, we find the old ratio of doctor to population preserved in the latest development of coöperative practice, and the large figures we are dealing with must be remembered when we come to consider the price. Medical benefit for this community cost £8,500,000, of which sum insurance doctors received nearly £6,200,000 for discharging their normal responsibilities in attending and treating insured persons; and about £1,840,000 of the balance was paid to insurance pharmaceutical chemists for the supply of drugs and appliances. The residue was expended, in sums small by comparison with the amounts already stated, in financial adjustments necessitated by the granting of medical benefit in special conditions or circumstances. For example, about £200,000 was paid to country doctors on account of mileage, a figure that will not appear in the least excessive to those who know the demands made by a practice where the activities ramify rather than concentrate. Assistance was also rendered in such matters as the maintenance of telephones, motor cars, and branch surgeries, while about £190,000 was paid to practitioners for medicines and appliances supplied by them as part of emergency treatment, for medicines administered by them personally, and for medicines dispensed by them in country districts where no pharmaceutical chemists could be reached by the patients. Further sums of about £66,000 and £15,000 were paid on account of insured persons who exercise their option to make their own arrangements for treatment. The number of these is small, a fact which suggests that the depreciating view of the panel practitioner, which not so long ago could always be expected from a certain type of critic, has found no public reflection. In which connexion we may refer to the sections in this Report dealing with the investigation on the one hand with alleged excessive prescribing, and on the other with falling away from the standard of treatment. These abuses are practically absent when the bulk of the work is considered.

THE CONCEPTION OF NEPHROSIS.

THE label "chronic parenchymatous nephritis" has long been regarded as unsatisfactory, since patients suffering from albuminuria with œdema show great variation in the clinical course of their disorder and in response to treatment. A school of observers in America and Germany, of which A. EPSTEIN, F. MUNK, F. VOLHARD, and T. FAHR are perhaps the principal exponents, have attempted to separate off a group of patients in whom vascular lesions are completely absent, and for whom the prognosis is believed to be good, provided that a high protein diet, often coupled with thyroid medication, is instituted. The term nephrosis, as distinct from nephritis, given to this syndrome has not been generally accepted by physicians and pathologists in

Great Britain, and the views of the champions of the new classification have been frequently misunderstood or imperfectly appreciated. Most of them have been inclined to regard the syndrome as a disorder of general metabolism rather than as a disease of the kidney. Certain clinical features are essential if a case is to be placed in the category of pure nephrosis, as the term is understood by those who have supported its adoption. These clinical features are: (1) A generalised œdema with an intense albuminuria. (2) A urine of good concentration, of which the daily output is inclined to be diminished, containing no blood or any abnormal elements except albumin, fatty and hyaline casts, and doubly refractile lipoid droplets. (3) Complete absence of signs of cardiovascular involvement—i.e., a normal blood pressure, absence of cardiac hypertrophy, and a normal fundus oculi, except possibly for signs of œdema. (4) A blood picture which shows no abnormality in its chemical constituents other than increase in cholesterol and in the ratio of globulin to albumin. L. ASCHOFF has justly emphasised the absence of evidence of vascular involvement as the essential feature of this group of patients, distinguishing them from those suffering from severe and progressive "mixed nephritis" with a bad prognosis. EPSTEIN and others contend that cases of true nephrosis are relatively common and are so benign that the absence of data on their morbid anatomy is readily explicable. This view is challenged by many pathologists, who contend that cases of so-called nephrosis are merely cases of Bright's disease in which the glomerular lesion has been so slight as to escape observation for a time; but that if they are watched over a proper period the usual downward course of inflammatory disease of the kidney will become apparent.

This criticism is supported in a brief but admirably written review [1] by Dr. H. A. CHRISTIAN. He refers to interesting experiments, still unpublished, in which the blood protein of dogs was kept low for a long time by means of venesection, anæmia being prevented by the reinjection of the washed red blood cells. These dogs were found to develop œdema and a general picture indistinguishable from that of nephrosis. He goes on to express his belief that a primary renal lesion is probably always the initial disease in cases of human nephrosis, and that it is the leakage of albumin consequent on this lesion which is responsible for the whole of the remaining picture. It is certain, as Dr. CHRISTIAN points out, that autopsies on patients with a history of œdema and albuminuria showing no lesion of the renal glomeruli or, indeed, any renal disease beyond some degeneration of the tubules, are rare. When such cases are discovered the cause of death is usually a pneumococcal infection of the ascitic fluid. Summarising the investigation, Dr. CHRISTIAN concludes that, after all, not much more is known to-day than was understood by the older clinicians by the terms parenchymatous nephritis, amyloid disease of the kidney, syphilis of the kidney, the lipæmia of certain cases of nephritis, and the pasty pallor, œdema, and languor of some forms of nephritis. Extensive tubular degeneration in certain types of large white kidney has been known for a long time. Older descriptions of amyloid kidney and syphilitic nephritis, allowing for differences in terminology and lack of some new laboratory methods, correspond extremely closely with those of "lipoid" nephrosis. Diminution of concentration of plasma protein was noted by BRIGHT in 1836, as was the milkiness of the serum; he says, "if the blood is drawn it is often buffed or the serum is milky and opaque; and nice analysis will frequently detect a great deficiency of albumin." Changes in the albumin globulin ratio have been the subject of study for many years, and opalescent serous effusions were also demonstrated long ago. Lower basal metabolism had to await clinical methods for its determination, and this, according to CHRISTIAN, is about the only new feature that recent investigations have added to our knowledge of the group of patients with extensive œdema of renal origin. Many British physicians will endorse this opinion.

Those interested in this abstruse problem will welcome a new publication [2] by another American observer, H. ELWYN, whose previous book on nephritis was read with interest in this country. His new work, which is devoted almost entirely to a discussion of the mechanism of production of œdema in various conditions, appears to be largely a compilation from the German and American literature, and students of the subject will regret the entire omission of reference to the work of A. OSMAN, F. WIDAL, C. ACHARD, G. A. HARRISON, T. IZOD BENNETT, and other English and French workers in this field. The book is stimulating in the emphasis which it lays on the aspect of œdema as a compensatory mechanism designed to maintain the equilibrium of the circulating and tissue fluids of the body. The author belongs to the school which regards nephrosis as a condition in which there is an initial primary renal lesion, but he differs from CHRISTIAN in that he accepts the possibility of distinguishing these cases for purposes of prognosis. In the section on treatment Dr. ELWYN gives a practical account of the employment of ammonium chloride, calcium chloride, and the new mercurial substances, such as novasurol and salyrgan without laying much emphasis on the occasional untoward effects from these substances which have been reported.

THE TREATMENT OF PNEUMONIA.

CONTRADICTORY instructions on the proper way to treat pneumonia still abound in the literature. Specific treatment has certainly advanced in recent years, but though potent polyvalent serums are now available reports show their virtue to depend mainly on the type of infecting organism. In those fortunate districts where type I. is the most common infection serum treatment has given surprisingly good results when injected early and in large doses. Two years ago Prof. LUDOLPH KREHL spoke enthusiastically of its merits from his experience in Heidelberg at the meeting of the Deutsche Gesellschaft für Innere Medizin held at Wiesbaden in April, 1927, and reports from other European sources have confirmed his conclusions. According to many American workers specific therapy is also successful against type II. when a highly potent serum is given in large quantities early in the course of the disease.

In a controlled series of cases R. L. CECIL and W. D. SUTLIFF [3] found that the death-rates of infections with type I. treated with and without serum were 32 and 18 per cent. respectively; for infections with type II. the corresponding figures were 52 and 39 per cent. Unfortunately, patients infected with types III. and IV. are not helped by the serum, and since in different countries and in different epidemics the

[1] Jour. Amer. Med. Assoc., 1929, xciii., 23.

[2] Edema and its Treatment. New York: The Macmillan Company. 1929.

[3] Jour. Amer. Med. Assoc., 1928, xc., 2035.

proportion of the types varies considerably serum treatment is not yet of universal application. Other forms of specific treatment are legion, which is only another way of saying that none is really specific. Optochin, introduced by MORGENROTH in 1911, has never been widely employed because the difference between the therapeutic and toxic doses is so very small. Vaccines are not generally popular, though W. H. WYNN and others have reported their successful use when given very early. To assess the value of any form of therapy is difficult in such a variable and self-limiting disease, and the practitioner must fall back, therefore, on general principles. But these are not yet really established, even in respect to important decision whether the patient is to be protected from all draughts or nursed as far as possible out of doors. The courage needed for enjoining the open-air régime in inclement weather is considerable and family doctors will be relieved to hear that the fashion is not unchallenged. There is some support in recent literature even for the practitioner who would nurse his pneumonias with closed windows. Prof. YANDELL HENDERSON,[4] asserts that closure of a bronchus or bronchioles is a determining factor in the development of pneumonia. He claims that the deep breathing induced by carbon dioxide has proved capable of preventing such closure and of keeping the lungs open, and that therefore inhalation of carbon dioxide not only offers prophylaxis in the early stages of pneumonic infection, but may be of therapeutic value even in advanced stages of the disease. Even more unconventional are the views recently advanced by Dr. G. G. CORNWALL[5] who regards "cold air treatment" as definitely dangerous. He puts the safeguarding of the patient from chills as second in importance only to the avoidance of unnecessary examinations. British physicians will endorse this piece of advice, for it is an accepted canon in most of our schools that, once a diagnosis of lobar pneumonia has been made, it is unnecessary to examine the patient's back for at least seven days. The temperature chart, the pulse, the quality of the heart sounds, and the data available by percussion over the front of the chest will be amply sufficient to tell the doctor all he needs to know. The drugs valued by Dr. CORNWALL are those stimulants and sedatives which are used with nice judgment in all countries by keen physicians. With some of his precepts few will agree, for Dr. CORNWALL aims at underfeeding (the maximum allowed is 1200 calories), and he holds moderate constipation to be not undesirable. He looks upon many of the symptoms of pneumonia as mere manifestations of ameliorative and reparative processes calling for no meddling. Views based on a considerable experience should not, however, be overlooked. Dr. CORNWALL supplies a review of several hundred patients in two groups. The first group were not treated strictly in accordance with his ideas and showed a mortality of 30·6 per cent.; a second similar group on whom the treatment which he calls "physiological support" was practised showed a mortality of 17·6 per cent. The only form of treatment common to all methods of treating pneumonia seems to be that enjoining rest in bed, and the only lesson emerging at present is that unless this is insisted on the prognosis is bad.

[4] Jour. Amer. Med. Assoc., July 13th, 1929.
[5] Med. Jour. and Record, 1929, cxxix., 661.

Annotations.

"Ne quid nimis."

HEALTH IN BRITISH INDUSTRIES.

YEAR by year the annual reports of the Chief Inspector of Factories recount the activities of a health service which has done and is doing an immense amount to ensure the well-being of our industrial workers. Dr. J. C. Bridge's report[1] for 1928 tells of a combination of depression in many industries with activity in such luxury trades as motor cars, tobacco, wireless, artificial silk, chocolates, and gloves. Industry continues to grow rapidly round London, attracted by a great market and port. The small workshop is rapidly disappearing before the large factory, as labour-saving devices replace manual work, and this is a change for the better when a modern machine bakery displaces an underground bakehouse, or a "ready made" factory gets rid of tailors' and dressmakers' dens. Much attention is being paid to accident prevention, particularly by safety-first methods. Over 70 per cent. of industrial accidents are unconnected with machinery, and about a quarter are due to persons either falling or being struck by falling bodies. About one accident in ten becomes septic through infection—a high proportion when all accidents do not result in wounds. An account is given of the spread of safety organisations in various industries and of the consequent reduction in accidents which fell in our engineering works from 18·0 per 100 persons in 1924 to 6·8 in 1928; apart from humane considerations such reduction is, of course, a sound economic proposition. The welfare order for bakehouses, which calls for the provision of wholesome drinking-water, has disclosed the absence of such water in a number of districts of twentieth century Britain. Extension of welfare departments in works, large and small, is reported, with organised supervision by doctors and others of the health of operatives. Gradually employers are perceiving that money is saved by preventing sickness. Here an important development is occurring in the elimination of silica dust, and with it silicosis, from grinding metals. The grindstone has been almost entirely superseded by the abrasive wheel, which originates far less dust and liberates little or no free silica. The new wheels work better and quicker, and even the Sheffield "little mesters," with their almost passionate devotion to their sandstones, are ceasing to demand the right to have "tuberculosis if they wanted to." Many will read with delight the historical account of the cutlery trade to which a chapter is devoted; it will often be quoted. Of particular interest is the account given of two fatal cases of "acute" silicosis, due to inhaling dust of silica with an alkali generated in making scouring powders composed of soda ash, soap powder, and ground silica. They occurred in women after two and four years' exposure respectively. Hitherto, silicosis has been regarded as a disease of middle-aged men who have had many years' exposure to the dangerous dust. Another pulmonary trouble has also been recognised, due to inhaling asbestos dust generated while weaving this inorganic fibre; it produces a fibrosis which tends to be fatal. Lead poisoning continues to decline; there were 1058 cases in factories in 1900, 505 in 1910, and only 239 in 1928. In addition, 87 cases occurred from painting buildings which to-day causes far more cases of lead poisoning and fatalities than any other occupation. Anthrax has diminished in the woollen trade, but infection through hides and skins has increased. Cancer of the skin, with 175 cases, remained steady and undiminished; oil contributed 105 of these cases, nearly all in mule-spinning, with the scrotum as the site affected in 69 per cent. Dermatitis claimed

[1] Annual Report of the Chief Inspector of Factories for the Year 1928. Cmd. 3360. H.M. Stationery Office. 1929.

considerable attention, due often to substances, notably alkalis, used to clean the skin after work; they dissolve the grease which holds the superficial skin cells together, leaving the ubiquitous germ to penetrate to the relatively unprotected deeper layers. Other cases originated from oil and "suds" in engineering. A clean skin and an emollient application prevent these troubles. The general impression to be gained from reading the report is that health depends far more than is often thought upon the way life is lived, and that sickness and disease are earned by exposure to faulty environment.

THE JAW-WINKING PHENOMENON.

THERE is an anomaly, first noticed in 1883 by the late Mr. Marcus Gunn, which affects certain people, most of whom have a partial congenital ptosis, generally unilateral. It is noticed that in these people, when the mouth is opened, and especially when the lower jaw is turned to the same side as the eye with ptosis, that eye is opened; when the mouth is closed the lid falls again. A. Léri and J. Weill[1] have lately reported this anomaly in two patients—a mother and son—and this is interesting because a familial incidence has rarely been noted before. In the mother the affection was bilateral, which is also very exceptional. The son had facial asymmetry, with partial atrophy of the side affected with ptosis. A similar facial asymmetry was seen in a daughter also (third generation) but she did not show the jaw-winking phenomenon. As regards causation, the explanation which has obtained most acceptance is that of Mr. Bishop Harman,[2] who attributes the condition to atavism. He points out that the first gill-slit or "spiracle" of fishes, which is homologous with the human external auditory meatus, is surrounded by a deep and also by a superficial muscle. The deep muscle extends to the lower jaw which it depresses, and is homologous with the external pterygoid in man. The superficial one closes the orifice of the spiracle and also extends to the upper eye-lid which it closes. These two muscles are antagonistic. Anyone who watches fishes in an aquarium will see that when a fish opens its mouth the operculum covering its gills swings open too. In the same way when one of the subjects of this anomaly opens his mouth the orbiculus palpebrarum ceases to act, and the levator, though generally weak in these cases, has it all its own way. This is the explanation which finds favour in England, but the French authors we have mentioned are not satisfied with it, and prefer to regard the phenomenon as a "functional association" analogous to those seen in some cases of hemiplegia.

GROWTH-INHIBITING SUBSTANCES.

SUBSTANCES—or supposed substances—which encourage growth have become very familiar in recent years. The tissue-culturist adds embryo extract to get the tissues to grow in vitro, the nutritionist gives the observed rats vitamins. The assumption is made with considerable regularity that failure to grow is due to the absence of something which promotes growth rather than to the presence of something which retards or inhibits growth. The demonstration of growth-inhibiting substances in animal and vegetable tissues is therefore of rather particular interest and may have far-reaching implications. Dr. T. B. Heaton, of Oxford, showed some time since that extracts of animal organs had a thermostable property (conveniently spoken of as a substance) of selectively inhibiting the growth of fibroblasts from fowl embryos in tissue cultures; on the growth of epithelium from the skin or bowel it had no influence. He now (*Journal of Pathology and Bacteriology*, 1929, xxxii., 565) follows this idea out in greater detail. All tissue growth in vertebrates depends on the coördinated and commensurate growth of the connective tissue with its blood-vessels. A substance which obstructs the growth of fibrous tissue should therefore impede growth as a whole. He shows that from animal tissues yeast and especially malt extracts may be made which delay the metamorphosis of tadpoles and the regeneration of amputated parts in newts; given intraperitoneally to young rats they cause immediate cessation of growth which is resumed when the dosing is omitted; pregnant guinea-pigs stop increasing in weight and abort. These are the general results of extracts which are active in preventing the growth of fibroblasts in tissue cultures; extracts which are negative to this test have no effect in the whole animal. Analogous experiments with the Jensen rat sarcoma gave similar results, the tumours ceasing to grow, and in some instances being completely absorbed. Dr. Heaton's observations are not perhaps in all instances as ample as might be wished, but they seem to open the way to an interesting and important line of inquiry.

[1] Bull. de la Soc. Méd. des Hôp. de Paris, July 8th, p. 875.
[2] Trans. Ophthal. Soc., 1903, xxiii., 356.

THE LESIONS OF ACUTE RHEUMATISM.

Dr. A. F. Bernard Shaw has just published some valuable histological researches on the lesions of acute rheumatism. The source of the material was a girl of 15 who died from rheumatic fever and chorea. The exhaustive pathological and histological study made of this case is recorded in minute detail with many illustrations in the current issue of the *Archives of Diseases in Children*. Dr. Bernard Shaw shows that the virus of rheumatic infection has a predilection for connective tissue. The initial lesion there is a necrosis of the collagen followed by a focal infiltration with mobile cells including lymphocytes, plasma cells, macrophages, and many polymorphonuclears. The process is well seen in the Aschoff nodes in the myocardium, but is by no means uncommon in such widely different places as the tendinous slips of muscle, aponeurotic tissues and arterial adventitia. The lesions in the walls of the nutrient arteries of the heart valves, coupled with those primarily in the connective tissue of the valves themselves, bring about a condition of valvulitis which may exist—and on the right side of the heart probably often does exist—without actual break of endocardial continuity. Valvulitis is, of course, often a precursor of endocarditis. The liability of a purely valvular lesion to advance to endocarditis depends on the degree of circulation of the virus permitted within the valve by its intrinsic arterial tree and the amount of mechanical stress to which the valve is exposed. Anatomical research on the intrinsic vascularity of the valves and physical assessment of the stresses to which each is exposed would lead to the theoretical assumption that endocarditis would involve the valves in the following order of frequency—mitral, aortic, tricuspid, pulmonary. This is the precise order of frequency found in practice, and therefore the suggestion that endocarditis is partly due to advancing valvulitis caused by intrinsic arterial and connective tissue lesions, and is not transmitted only through the blood is well supported.

In addition to discussions on the mechanism of the production of rheumatic endocarditis Dr. Bernard Shaw gives full and new descriptions of the widespread local manifestations of the general rheumatic infection in the heart muscle, the brain and meninges, the serous membranes, the muscles, the viscera, arteries and veins, and the lymphoid tissue. Generally speaking, the brunt of the attack is borne in the first place by the connective tissue which presents focal necrotic lesions as the primary event and secondary cellular infiltration leading to the formation of a nodule. As a result of his histological researches the author dissents from the view that a deposit of fibrin forms the essential basis of a node. He is careful to explain that valvulitis may exist witho

subsequent or associated endocarditis, and some of his descriptions of the architecture of the lesions suggest that the primary lesion of the rheumatic virus, wherever it occurs, shows a strong tendency to heal. On the other hand, in the case described, the tricuspid valve showed abundant microscopic evidence of valvulitis but none of endocarditis, and the inference is that in many cases the valves of the right side of the heart in rheumatic fever are the site of valvulitis without clinical or macroscopic evidence of frank endocarditis.

Dr. J. Purdon Martin, in our columns last year,[1] showed in a case of chorea a sharply defined vascular lesion at the base of the brain in the body of Luys. This structure is subjacent to the thalamus and is probably in contact with both cerebellar and pyramidal fibres. In Dr. Martin's case the lesion caused an illness indistinguishable in many respect from rheumatic chorea, and he therefore indicated the body of Luys as a probable site for focal rheumatic infection in ordinary common chorea. Dr. Bernard Shaw found no adequate anatomical bases for the chorea in any part of the brain.

THE RED CELL SEDIMENTATION TEST.

THE red cell sedimentation test has found but little popularity in England and is far less generally used here than abroad. This is perhaps fortunate since our knowledge of its significance in clinical medicine is still far from complete. Nevertheless, the subject now has a large literature, and there is no doubt that the test offers us aid in diagnosis and prognosis that can no longer be ignored. The two methods employed in carrying it out are very simple, and the minimum of apparatus needed is easily available for every practitioner. Both depend upon the rate at which the red cells sink in citrated blood on standing, and they differ only in the way in which results are recorded and in minor details of technique. Numerous modifications of these methods, which are associated with the names of Fahraeus, Linzenmeier, and Westergren, have been proposed, and results are usually given either in terms of the time taken for the deposit of red cells to reach a given height, or in terms of the height reached by the column in a given interval of time.

The diversity of the standards used by different workers and the variation in method have made it difficult to compare results, and have undoubtedly been partly responsible for the disrepute in which the test is held by many. Whichever method is adopted, all are agreed that normal healthy persons show a high suspension stability of the blood, which is to say, that the separation of red cells and plasma is slow. What this depends upon is not fully understood, and probably no single physico-chemical mechanism is entirely responsible. Prof. F. Reiche [2] has lately studied the relationship of the sedimentation-rate to some of the chemical constituents present in the blood, and to some of its physical properties such as the coagulation time and bleeding time. His investigations have been performed upon over 4000 patients, and include estimations of almost all the important substances that may be quantitatively determined in the serum and in blood. He could, however, find no one factor that could be causally related to alterations in the rate of sedimentation. This did not, for instance, depend upon the number of red or white cells present, nor upon the hæmoglobin percentage, nor upon the clotting power of the blood. Nor could Reiche confirm the suggestion that the protein content of the serum was the important factor, for variations in fibrinogen and albumin-globulin ratios were present with independent variations in sinking time. The number of platelets has also been thought to affect the rate of sedimentation, as has the size of the red cells as apart from their numbers; but apparently neither is in fact causally concerned. The amounts of chloride, calcium, cholesterin, sugar, and non-protein nitrogen were found to be independent of the suspension power of the blood.

An examination so thorough should command respect, and it must be confessed that at present no one knows what are the essential changes in the blood which increase the speed of sedimentation, or what are the factors which maintain its normal suspension stability. Despite this ignorance, however, certain general conclusions may justifiably be drawn from practical experience, and they are none the less valuable for an absence of explanation of these results. Thus it may be stated that abnormally rapid sedimentation of the red cells is always associated with organic disease and excludes a purely functional disorder. This alone is a help in differential diagnosis, for example, in neurasthenia and early phthisis. The most strongly positive results (i.e., the most rapid sinking) are usually found in those conditions in which tissue destruction, autolysis, and absorption of breakdown products are occurring; and may thus to some extent separate purulent from non-purulent, and acute from chronic inflammations. Negative results are of less significance in excluding such conditions; thus a normal reaction is occasionally noted in even advanced organic disease, and may sometimes be recorded in severe pulmonary tubercle—a condition in which the test has been widely applied as an aid to prognosis. On the other hand, positive results are very seldom seen in the absence of such disorders, except in the first two to three months of pregnancy. For the diagnosis of carcinoma the test is valueless. As a guide to the existence of latent toxæmia from the presence of a septic focus, and in the exclusion of purely neurotic conditions a positive result is of considerable significance. As an index of the progress of cases of both acute and chronic infections, notably in phthisis, the gradual return to normal of the sedimentation time of the red cells is of definite value. Many exaggerated claims have been made for its specific relationship to individual diseases, but within limitations this simple test seems to have its uses.

ASSISTED ALPINE CURES.

THE Queen Alexandra Sanatorium Fund, of which the annual report for 1928–29 has just been issued, made it possible last winter for 52 men and women to make a prolonged stay at Davos, when apart from such help they would not have been able to do so. For the last four seasons the practice has been to make block grants of £2 (50 francs) a week, allowing patients to choose their own accommodation from a list of approved establishments; and this grant scheme has worked well in practice, those who have been assisted by the Fund having recognised the responsibility which such a trust implies. Only two complaints were received from the visiting physicians in Davos, and one patient who was described by her medical attendant as "a happy-go-lucky young woman" nevertheless did extremely well. The Fund which gives these grants is the product of the sale of the Queen Alexandra Sanatorium which was built in Davos for British patients of small means some years before the war. As it proved impossible to reopen the sanatorium after the war at a fee within the reach of the class of patient for whom it had been intended, the Council of the Fund was faced with the alternative of altering the whole character of the institution, or of selling the building and devoting the proceeds to helping patients of small means to get treatment in Alpine climate in some other manner. The ordinary income of the Fund is about £2000 a year and it has recently been augmented by amalgamation with the St. Moritz Aid Fund, a smaller though similar organisation with its former seat in the Engadine. Last winter the assisted patients included two medical practitioners, two dentists, six students, three nurses, and many other professional persons. The average stay was 168 days and the

[1] A Contribution to the Study of Chorea, THE LANCET, 1928, ii., 315.

[2] Med. Klin., 1929, xxiii., 899.

medical records state that the disease was arrested in 2, apparently arrested in 5, much improved in 16, improved in 18, and slightly improved in 3. Both lungs were already affected in 31 cases, and 17 of them were febrile at the commencement of treatment. It is the desire of the Council of the Fund to give priority to those whose disease is such that a winter in the Alps may ensure a cure or consolidate one already begun, and it is hoped that the medical practitioners up and down the country, on whose recommendation the grants are made, will coöperate with the Council in selecting cases at an early stage of the disease. A second line of defence consists in the fact that a certificate of medical suitability must be obtained from one of the honorary examining physicians to the Fund. A list of these physicians and application forms are issued on request by the local secretary, Mr. W. G. Lockett, the British Consulate, Davos Platz, Switzerland.

A TREATMENT CAMP FOR CHILDREN.

IN the *World's Health*, the organ of the League of Red Cross Societies, there is usually something encouraging about the work these societies are doing in so many parts of the world. From the July number we learn how concerned South African public opinion is becoming about bilharzia, which is widespread there. Adults can come into the towns for treatment, but it is difficult to get tartrate of antimony injections to the infected children on the scattered farms. To Dr. Theron, assistant medical inspector of schools in the Rustenburg district, came the idea: why not gather the children in their holidays into a treatment camp? The suggestion caught on and help came from every side. The Transvaal Province gave £100, doubled later, and the Rustenburg primary school was rearranged as a temporary hospital with seven dormitories, an injection ward, and a room for urine analyses. Patients brought their own blankets and pillows, bedsteads were borrowed locally; mattress cases were lent by the Defence Department, the straw to fill them was begged from neighbouring farmers, who further gave much of the necessary food; Rustenburg municipality presented electric light and the extra water needed; Johannesburg school clinic lent the medical equipment; the South African Medical Institute of Johannesburg provided the distilled water, and the Red Cross gave the drugs. Two nurses were engaged, and 32 teachers and senior school girls, volunteering each for four to seven days, were invaluable in keeping the children employed and amused between their injections and entertainments. The camp opened with 60 children, but some were unsuitable and some were removed by friends; nevertheless, 49 completed their course, and all but one lost their hæmaturia. The parents paid £46 towards the cost of the camp which, thanks to local generosity, closed with a balance which it is proposed to use in providing a swimming-bath for Rustenburg, to diminish infection in future. The camp is considered a great success and was visited by many medical men. Could children with this disabling disease have spent their Christmas holidays more advantageously?

ADAPTATION OF THE EYE TO DARKNESS.

THE Medical Research Council issues a report[1] summarising the literature (chiefly German) on the dark adaptation of the eye. On the whole, variations in the sensitiveness of the retina in a state of dark adaptation are remarkably constant, not only in the same, but in different persons, and these may be due to the individual state of health, as is indicated by the recent discovery of the association of night-blindness with vitamin deficiency. A great deal of experimental work has been done on various aspects of the subject, such as the latent period between stimulus and sensation (Empfindungszeit), the duration of the primary sensation (Empfindungsdauer), the duration of what is called the colourless interval, the regional variations in the sensitiveness of the dark-adapted retina, and especially the question of dark adaptation at the fovea. It is said that foveal adaptation is now established, though this is hard to prove because it is almost impossible to fix an object of threshold intensity which is small enough to affect the fovea alone. Anyhow, the adaptation is very slight and only occurs during the first few minutes. The vexed question of the presence or absence of the Purkinje phenomenon (change of relative brightness of different colours as dark adaptation increases) at the fovea is still unsettled, most investigators finding no evidence for its presence. This and other questions discussed in the report are important in their relation to the physiology of the rods and cones, the duplicity theory, and colour vision. They have also an immediately practical bearing on aviation, for in testing the visual fitness of an airman for night-flying it is desirable to determine both his absolute sensitiveness for light and his rate of recovery after the relative blinding which follows exposure to light for short periods. Finally, the report considers dark adaptation in certain pathological conditions. The theory that what vision there is in total colour blindness is due entirely to rod function is supported by the frequent presence of a central scotoma. Night-blindness is the opposite condition in which the function of the rods is supposed to be defective. It is well known that in retinitis pigmentosa dark adaptation is especially defective. It is said to be defective in glaucoma and also in true optic neuritis, but not in choked disc.

[1] Medical Research Council: Reports of the Committee upon the Physiology of Vision. II. Dark Adaptation (a Review of the Literature) by Dorothy Adams. London: H.M. Stationery Office, 1929, pp. 138.

THE GENESIS OF TROPICAL NEURASTHENIA.

WHILE all students of European life in the tropics admit that neurasthenia is a common phenomenon, few of them agree about its cause. Lieut.-Colonel Berkeley Hill contributed to the Seventh Congress of The Far Eastern Association of Tropical Medicine, held in British India in 1927, the transactions of which have now reached us,[1] an able paper on Mental Hygiene of Europeans in the Tropics. Such terms as "Punjab head" "West Coast head" imply the popular recognition of the existence of a form of neurasthenia which may take various shapes. Europeans living in the tropics are prone to a neurotic syndrome, the germ of which is a state of hyperexcitation manifested in general irritability. Although hyperexcitation may appear as a symptom of any form of psychoneurosis, it is manifest most consistently in anxiety neuroses. Symptoms, apart from worry and anxious expectation, may, in both sexes, take the form of hypochondria, which may be related to sunstroke, glare, and bowel complaints. Following Freud's conception of ætiology, Col. Berkeley Hill concludes that the prime factor in this anxiety neurosis, at any rate in men, is voluntary abstinence from sexual intercourse. The typical syndrome is found to be accentuated in the European doomed to live in an out-of-the-way place. Here the absence of others of his own race and class may bring about a loss of self-respect, and some degree of alcoholism may develop. Alcohol reduces the inhibitory forces in every direction, and a loss of control over the emotions is an early symptom. Occasionally Europeans in the tropics suffer from outbursts of anger or from a brooding melancholy. The far-reaching importance of psychological studies is a subject hardly appreciated in India. Col. Berkeley Hill notes that in the civil employment of the Government of India there are at present only four Europeans and two Indians who have had any special training in psychopathology. In the great cities of Calcutta, Bombay, and Karachi

[1] Calcutta: Thacker's Press and Directories, Ltd., 1929, i., 865.

there is no European or Indian neurologist or psychiatrist with European qualifications, and in the numerous schools and colleges throughout India there is no provision for adequate instruction in nervous and mental diseases.

APPOINTMENTS TO THE MEDICAL RESEARCH COUNCIL.

By an Order of the Committee of Privy Council, Viscount D'Abernon and Mr. A. G. Church, M.P., have been appointed members of the Medical Research Council on the retirement of the Earl of Balfour and Sir Charles Trevelyan. Lord D'Abernon will succeed Lord Balfour as Chairman of the Council. By another Order, made after consultation with the Medical Research Council and with the President of the Royal Society, Dr. J. J. R. Macleod, Regius professor of physiology in the University of Aberdeen, and Mr. Wilfred Trotter, honorary surgeon to University College Hospital, have been appointed members of the Council in succession to Prof. E. P. Cathcart and Sir Charles Sherrington, who retire in rotation on Sept. 30th.

BRONCHIECTASIS IN CHILDHOOD.

The clinical picture of fully developed bronchiectasis is fairly obvious but the early stages are apt to pass unrecognised, and this is the aspect of the disease which has attracted most attention of late years. In summarising the present position Dr. Edward Thorpe [1] points out that the exact ætiology of an essentially chronic disease of this kind is often hard to determine. So many serious infectious diseases of early childhood may damage the respiratory tract, and they often follow one another so surprisingly quickly that more than one may start the early changes in the bronchial walls. Most observers agree in placing broncho-pneumonia first among the forerunners, especially when it is associated with measles or whooping-cough. The cause of this is not quite clear, but in many such cases infection is kept up by an unhealthy condition of the nasopharynx which is only too common at this age, and such a sequence of events is especially prevalent among ill-nourished children who have had rickets. A vicious circle may be established so that the child is never free from recurrent respiratory diseases which have either begun in the lungs and augmented the infection in the upper air passages, or have started in the sinuses and tonsils and have increased the damage to the lining membrane of the bronchial walls. Saccular bronchiectasis, abscess formation, and empyema are but natural sequelæ of the primary infection. Prevention is therefore all-important. Adequate convalescence after broncho-pneumonia should be secured wherever possible, and the public should be made to look on measles and whooping-cough as potentially serious diseases. Early diagnosis is by no means easy on clinical grounds alone and radiological help should be invoked long before the condition has become self-evident. A positive result is, of course, evidence of disease, but negative findings should be accepted with reserve. In suspicious cases intratracheal lipiodol may be used; the technique is not difficult, the risk is negligible, and the radiogram obtained will sometimes reveal an unsuspected amount of disease. The treatment of such a case is difficult; any infective focus in the nasopharynx should be dealt with, and prolonged convalescence is needed. Of recent years collapse therapy has been tried in some of these cases with good results, despite the relative mobility of the mediastinum in children. As a rule, 12 months' treatment suffices. It is found that in advanced cases the results of inducing pneumothorax are poor, owing to the resistance to collapse offered by the hardened walls of the bronchiectatic cavities. In these circumstances Thorpe advocates repeated bronchoscopic lavage, a measure which has not yet found much favour in this country, owing to the difficulties of technique and the prolonged institutional treatment required. The established disease is a source of distress to all concerned, but could certainly be prevented as a rule by adequate convalescent treatment of its precursors, especially measles and broncho-pneumonia.

[1] Amer. Jour. Med. Sci., June, 1929, p. 759.

AN EPIDEMIC OF GLANDULAR FEVER.

In 1889 Pfeiffer described a disease in children in which there was fever, generalised swelling of the lymphatic glands, and enlargement of the spleen and liver. Eighteen years later Turk found that a similar symptom-complex was associated with well-marked lymphocytosis, and in 1920 the epidemic nature of the disorder was recognised in America. In this country in 1921 Letheby Tidy and others described cases of infective mononucleosis and identified it with the glandular fever of Pfeiffer. Since then many other cases have been described, the latest contribution to the literature being an account of an epidemic in Berne last year. Dr. E. Glanzmann [1] records that there were in all some 70 cases, 45 of them being distributed among 16 families, 2 to 4 of whose members were affected. Analysis of the notes he made on these cases enables him to give a clear account of the disease. The incubation period seems to be from seven to eight days and the earliest manifestation is a swelling of the lymphatic glands. The occipital and retro-auricular glands enlarge first, and later the axillary and inguinal glands. The swellings are for the most part moderately painful and sometimes the arrangement of the swollen glands about the face has suggested mumps. The bronchial glands may also be involved in the generalised lymphadenitis and the spasmodic cough thus caused may resemble whooping-cough. Lymphocytosis being a feature of the blood picture in both mumps and pertussis, it is easy to be led astray in isolated cases of glandular fever simulating either of these disorders. In his original papers Pfeiffer described an abdominal form of glandular fever with abdominal pain and enlargement of lymph glands especially in the ileocæcal region. The presence of an enlarged spleen and other glandular swellings help to make the diagnosis clear. There was a moderate fever in most of Glanzmann's cases, lasting usually one, two, or three weeks; it was of a daily remittent type and came to an end by lysis. Relapses were not uncommon and even when the fever had gone away the glandular swellings sometimes persisted for weeks and even months. Other organs were also affected, the liver being obviously enlarged in most cases and the spleen palpable in one-third to one-half of them. Stomatitis was noted in some of the children, and it was usual to find the lymphoid tissue of the nasopharynx taking part in the generalised lymphatic enlargement. In two cases a fleeting rubelliform rash was observed, whilst conjunctivitis was another occasional manifestation. The blood picture in glandular fever is characteristic, and in the first day or first few days of the illness 80 to 90 per cent. of the white blood corpuscles are mononuclear, though sometimes a polymorphonuclear reaction occurs at first, followed later by the mononuclear picture. The cells present are divided by Glanzmann into three types: lymphoblasts, "lymphocytoid" cells like very large lymphocytes, and still larger "monocytoid" cells. Upon ætiology he has nothing fresh to say, except that the urine of a patient with nephritis complicating glandular fever had no effect when injected into a guinea-pig. For treatment he recommends quinine during the febrile stage, with application of ultra-violet light to such glands as do not settle down after the acute symptoms are over.

[1] Jahrb. f. Kinderh., July, 1929, p. 250.

A MEMORIAL TO FERNAND WIDAL.

A LETTER in our correspondence columns addressed to Sir Almroth Wright contains the announcement of a movement which we hope will receive hearty support from the medical profession in this country. A group of distinguished Frenchmen, whose names will be familiar to our readers, have decided to form a committee with the object of erecting in the Faculty of Medicine in Paris and at the Hôpital Cochin a monument to the memory of the great pathologist. Already, we are informed, the movement has had international result, those responsible for it having received promises of support from other countries. The project should be received with similar sympathy in this country where many must have had personal relations with Widal, and where all pathologists are familiar with the value of his work.

RADIUM TRUST AND COMMISSION.

A MEETING of the National Radium Trust was held on August 13th under the chairmanship of Lord Parmoor. Viscount Lee of Fareham was appointed Chairman of the Radium Commission and a member of the Trust, which is now constituted as follows: Lord Parmoor, Lord President of the Council (Chairman); Mr. Arthur Greenwood, Minister of Health; Mr. William Adamson, Secretary of State for Scotland; Sir Ernest Rutherford, President of the Royal Society; Sir John Rose Bradford, F.R.S., President of the Royal College of Physicians; Lord Moynihan, President of the Royal College of Surgeons; Lord Dawson, President of the Royal Society of Medicine; Lord Mackenzie, Chairman of the Central Liaison Committee for Voluntary Hospitals in Scotland; Prof. A. H. Burgess, President of the British Medical Association; and Lord Lee of Fareham. The Trust made preliminary arrangements in connexion with the purchase of radium, with a view to placing it as soon as practicable at the disposal of the Commission.

The Radium Commission has now been set up in accordance with the provisions of the Royal Charter, and is composed as follows: Lord Lee of Fareham, appointed by the National Radium Trust; Lieut.-Colonel Smallman, Medical Officer of the Ministry of Health, appointed by the Minister of Health; Mr. H. L. F. Fraser, Assistant Secretary of the Department of Health for Scotland, appointed by the Secretary of State for Scotland; Mr. Sidney Russ, D.Sc., Professor of Physics at the Middlesex Hospital Medical School, appointed by the Medical Research Council; and Mr. G. W. C. Kaye, D.Sc., Superintendent of the Physics Department of the National Physical Laboratory, appointed by the Department of Scientific and Industrial Research. The following members of the Commission have been selected by the Trust from a panel of 12 persons nominated by the heads of the medical profession as "having special knowledge and experience of the application of radium in the treatment of the sick": Dr. J. M. W. Morison, Lecturer in Radiology in the University of Edinburgh; Mr. G. E. Gask, Professor of Surgery in the University of London at St. Bartholomew's Hospital; Mr. W. Ernest Miles, Surgeon to the Cancer Hospital, Brompton; Mr. Comyns Berkeley, Gynæcological Surgeon to the Middlesex Hospital; Dr. Carlton Oldfield, Professor of Gynæcology in the University of Leeds; and Dr. A. J. Hall, Professor of Medicine in the University of Sheffield.

WE regret to announce the death on Sunday last of Dr. William Ewart, consulting physician to St. George's Hospital, in his eighty-first year.

BICENTENARY OF EDINBURGH ROYAL INFIRMARY On August 6th, 1729, the first patient was received at the small Edinburgh hospital which has now become the Royal Infirmary. The bicentenary will be celebrated in October.

The Clinical Interpretation of Aids to Diagnosis.

A Series of Special Articles contributed by Invitation.

XL.—EXAMINATION OF THE BLOOD FOR BILE-PIGMENT.

JAUNDICE is due to the presence of bile-pigments in the body tissues, particularly the skin, the primary underlying condition being, however, an excess in the blood of bilirubin, the chief bile-pigment. The present tendency is to direct more attention to the primary or blood condition and less to the secondary factor, the tissue staining. "Overt jaundice" refers to the condition where the skin colour is visible, in contrast to "latent jaundice" in which, though there is a hyperbilirubinæmia, no skin changes can be seen. Bile-salts are normally present in the blood and if in jaundice these are normal or diminished in quantity, with a hyperbilirubinæmia, the condition is known as "dissociated jaundice."

How Bilirubin reaches the Liver.

Bilirubin is derived from hæmoglobin, the cycle probably being as follows. The hæmoglobin is first broken down into globin and hæmatin. The iron-containing part of the hæmatin is then split off as hæmosiderin and the iron-free remainder of the molecule is converted into bilirubin, either directly or through an intermediate or prebilirubin stage. This final conversion takes place in the cells of the reticulo-endothelial system of the body, which is represented in the liver by the cells of Kupffer. These latter cells line the vascular capillaries and are separated from the bile capillaries by the polygonal or special hepatic cells. As the reticulo-endothelial system is not limited to the liver, being particularly well represented in the spleen and bone-marrow, it follows that bilirubin in the liver may have been formed there (hepatogenous) or may have been brought there by way of the blood (anhepatogenous).

How Bilirubin may Leave the Liver.

From the liver three ways of escape are possible.

(*a*) All bilirubin may pass through the polygonal cells into the bile capillaries; this is the normal course.

(*b*) All may pass away by the vascular capillaries.

(*c*) Part may pass into the bile capillaries, part may leave through the blood.

During the passage through the polygonal cells a change takes place in the bilirubin, the exact nature of which is unknown, but is thought to consist in the removal of a protein radicle. On this change, van den Bergh established the test which bears his name, for he found that the reaction of the pigment to the diazo reagent—i.e., diazotised sulphanilic acid—differed according as the bilirubin had passed through the polygonal cells or not. If the bilirubin has followed the normal course—that is, through the polygonal cells into the bile capillaries—the addition of diazotised sulphanilic acid at once produces azobilirubin, which has a deep violet colour. Bilirubin which has not passed through the polygonal cells requires the addition of alcohol to form azobilirubin, the suggestion being that the alcohol first precipitates the protein radicle and is then able to take up the pigment in solution and so produce the deep violet colour.

THE VAN DEN BERGH TEST.

The full technique of the van den Bergh test is set out in text-books of biochemistry. It suffices here to say that sera or blood plasma from different types of jaundice give different colour and time reactions, which are described as being *direct* or *indirect*, according as the coupling takes place in non-alcoholic or alcoholic solutions.

While the colour, and time required, vary within small limits, according to the observer and the solutions used, the reactions in icteric serum or blood plasma before the addition of alcohol may be summarised as follows.

1. Immediate colour change, maximal in 10–30 secs., bluish violet, intensity dependent on amount of bilirubin, known as the *prompt* or *immediate direct reaction* and characteristic of jaundice due to bile passage obstruction.

2. Colour change beginning in 1 to 15 minutes, or even longer delayed, reddish at first and gradually deepening to violet, known as the *delayed direct reaction* and characteristic of jaundice due to hæmolysis.

3. Colour change at once, reddish at first, slowly or rapidly changing to blue, known as *biphasic direct reaction;* as the rate of change approaches more closely to prompt or delayed types, it is further described as *biphasic prompt direct* or *biphasic delayed direct*. This reaction is the one most frequently present in toxic infective jaundice.

Quantitative Estimations.

In alcoholic solutions all icteric sera give an immediate reaction known as the *indirect reaction*, and this can be used quantitatively by comparison with known standards, whereas the direct reactions are only qualitative. For purposes of estimation one part of bilirubin in 200,000 is known as a "unit" of bilirubin or a "van den Bergh unit." Normally the amount of bilirubin in the blood, known as the functional bilirubinæmia, varies from 0·2 to 0·6 units (1–1,000,000 to 1–350,000); when obstruction is present bilirubinuria occurs with a concentration of 1–50,000 (approx.); jaundice is said to be present with a concentration of 1–80,000 (approx.), though it may not be visible; in long-standing cases a concentration as high as 1–4000 has been reached.

A New Conception of Jaundice.

As a result of the van den Bergh reaction a new conception of jaundice has been formulated, according to which jaundice may arise in several ways.

1. When the bile-pigment is normally formed, but obstructed after reaching the bile capillaries and then reabsorbed into the blood.

2. When the polygonal cells of the liver cannot deal with the amount of bile-pigment which reaches them. This may be due to (*a*) such damage or functional derangement of the polygonal cells that the pigment passes direct to the general circulation by the hepatic veins; or (*b*) too much bile-pigment reaching normal polygonal cells so that some passes through into the bile capillaries in the normal way, but the excess passes by the hepatic veins into the general circulation.

3. When there is present both damage to the polygonal cells and obstruction in the bile passages. In this case some bile-pigment may get through the partially damaged cells to be obstructed in the bile passages and reabsorbed, while some passes directly to the general circulation by way of the hepatic veins.

It is on these theoretical considerations that J. W. McNee has founded his classification of jaundice:—

1. Obstructive } hepatic jaundice.
2. Toxic infective }
3. Hæmolytic jaundice.

While all cases of jaundice can be covered by these three divisions, it does not follow that all clinical varieties can be confined within one division. In a complex organ like the liver one pathological state passes gradually into another, and as McNee puts it, "Toxic jaundice, with varying degrees of damage to the liver cells, may be combined with hæmolysis, and in its later stages with obstruction of the biliary passages as well."[1]

IMMEDIATE DIRECT REACTION.

When the van den Bergh reaction is *immediate direct* the diagnosis is probably obstructive hepatic jaundice at an early stage of its development. Here the bile is normally formed but there is obstruction in the bile passages and the bile is reabsorbed into the blood. A biphasic reaction would not exclude this type of jaundice, for at a later stage complete obstruction may produce liver damage. When this has occurred, however, the jaundice properly belongs to the toxic infective group.

Van den Bergh reaction.	Type.	Pathological change.		Bilirubinæmia.	Jaundice.	Bile-salts.	Resistance to saline hæmolysis.
		Nature.	Site.				
Direct prompt.	Obstructive.	Obstruction.	Biliary passages.	Large.	Marked.	Increased.	Increased.
Biphasic.	Toxic infective.	Damage.	Liver cells.	Varies.	Varies.	Dissociated jaundice.	—
Direct delayed or indirect.	Hæmolytic.	Increased blood cell destruction.	Extra-hepatic.	,,	Inconstant and varies.	,,	Decreased.

The table summarises within very wide limits some of the points of difference of the various uncomplicated types of jaundice In reading it the tendency of types to merge must be remembered.

The causes of obstruction are many and varied. They can be classified as:—

(*a*) Obstruction within the lumen of the bile passages—e.g., gall-stones or parasites.

(*b*) Obstruction due to changes in the walls of the larger bile passages—e.g., catarrhal or common hepatic infective jaundice, infective and suppurative forms of cholangitis. (In catarrhal jaundice the van den Bergh reaction may be of the obstructive type at first, but it is extremely variable and in later stages is biphasic and indicative of the toxic infective type. The same applies, and in greater degree, to the various forms of cholangitis.)

(*c*) Obstruction due to pressure on the bile passages from without—e.g., hepatic cirrhosis (jaundice often latent); intrahepatic tumours; malignant glands in the portal fissure, carcinoma of pancreas or stomach; chronic pancreatitis.

Many other possible causes have been mentioned, but a stone in the common duct and tumours of liver and pancreas are probably the most common causes of obstructive jaundice. Other blood characteristics are excessive bile-salts in the early stages, though their production soon ceases; the bile-pigment, however, continues to be formed, so that in the simple obstructive cases there is a definite relationship between the completeness and duration of the obstruction and the degree of jaundice. There is a slight hypercholesterolæmia and the coagulation time is prolonged. The resistance to hæmolysis by hypotonic salt solution is increased and the corpuscles are increased in size, the reverse being the case in hæmolytic icterus. Advanced obstructive jaundice shows a leucocytosis, but not the mild cases unless inflammation or suppuration is also present.

BIPHASIC REACTION.

A biphasic reaction is suggestive of toxic or infective jaundice. In this group, as the name implies, we are dealing with some infection or intoxication which produces a degeneration of the liver cells and later probably a cholangitis. The van den Bergh reaction is generally biphasic but may vary from time to time as the condition progresses or as the amount of secondary biliary obstruction fluctuates. Among the conditions classified in the

[1] Rolleston and McNee: Diseases of the Liver, Gall-bladder, and Bile-ducts, London, 1929.

toxic or infective group are catarrhal jaundice, spirochætosis hæmorrhagica, acute necrosis of the liver. Various protozoal and bacterial infections may give rise to this type of jaundice, also chronic cardiac disease with back pressure, and some forms of poisoning or toxæmias, such as those associated with pregnancy. Considering the group as a whole there is less bilirubinæmia than in the obstructive group, and grave liver derangement may coexist with slight jaundice. Bile-salts may be absent from the blood even when jaundice is well marked (the so-called "dissociated jaundice"). Some bile generally reaches the bowel so that the stools are not clay-coloured, but they are often offensive owing to the absence of bile-acids.

Points in the differential diagnosis of the various members of the group are as follows:—

In *Spirochætosis hæmorrhagica* (Weil's disease) there is a polymorphonuclear leucocytosis and later a secondary anæmia; in the early stages the *Leptospira icterohæmorrhagiæ* is present in the blood and later in the urine. In *acute yellow atrophy* the blood shows delayed coagulation, a moderate leucocytosis, and diminished cholesterol; the colon bacillus is sometimes present on culture. In *catarrhal jaundice* there is a secondary anæmia with leucopenia.

Reaction of Delayed Type.

When the van den Bergh reaction is of the delayed type, or gives no direct response at all, hæmolytic jaundice may be suspected. In this type of icterus the underlying factor is an excessive bilirubinæmia due to the production of more bile-pigment than even a healthy liver can deal with. This excess may be due to: (1) increased destructive agents; or (2) increased fragility of the blood cells.

When it is due to increased destructive agents (so-called secondary cases) the cause of the hæmolysis is more or less known. Blood transfusion with unsuitable donors, streptococcal infections, parasitic infections, poisoning from snake-bite, Addison's anæmia, or blackwater fever may induce hæmolytic jaundice of this kind. On the other hand, the hæmolysis may be due to increased fragility of the blood cells—for example in congenital, hereditary, or familial acholuric jaundice or in acquired acholuric jaundice (often after some infection). How far these two types of acholuric jaundice are separate entities is a debatable point.

Taking the group as a whole hæmolytic jaundice is a "dissociated jaundice," since the bile-salts are not retained in the blood. The tissue reaction may be slight compared with the amount of bilirubinæmia and, finally, the kidney threshold for bilirubin is decidedly higher than in the obstructive type. The icterus is inconstant and varies greatly, there is some degree of secondary anæmia, and the spleen is often enlarged. With regard to special members of the group, the blood picture is that of the primary disease in those of the secondary type. In acholuric jaundice the presence of reticulated red cells (only shown by vital staining) and the undue fragility of the red corpuscles is a constant feature. If normal red corpuscles are placed in varying dilutions of hypotonic saline, hæmolysis starts at about 0·50 per cent., is well marked at 0·45 per cent., and is, as a rule, completed at 0·35 per cent. In acholuric jaundice hæmolysis starts at about 0·70 per cent. and is often completed at 0·50 per cent.

Fouchet's Test and the Icteric Index.

The van den Bergh reaction is quantitative and qualitative. There are two other quantitative tests for bilirubinæmia—Fouchet's test and the icteric index. The former, which is largely used in France, is not so sensitive as the van den Bergh test, but is said to give a positive result in a dilution of 1–60,000 of bilirubin. In estimating the icteric index the yellowness of the serum is compared against a known standard. The normal lies between 4–6, overt jaundice is present when the index is above 15, and latent jaundice lies between 6–16. The index is raised in uncomplicated cases of hæmolytic anæmias, in chronic sepsis especially of the biliary tract, in pneumonia, and in cardiac insufficiency. A source of error is coloration due to pigments from ingested food so that the blood should be taken from the fasting patient. Since the test can be done with the blood available from a finger prick it has certain advantages, but if any doubt exists it should be checked by the van den Bergh reaction. In a case of overt jaundice it presents an easy method of noting the progress of the bilirubinæmia.

Conclusion.

In addition to their value as a diagnostic agent in jaundice, the van den Bergh reaction and to a less extent the icteric index are of use in checking treatment and in prognosis. A routine examination of the blood shows the progress of the bilirubinæmia before any change is visible in the skin. The detection of a latent jaundice may be of great value, particularly in cases undergoing treatment with arsenical compounds.

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Special Articles.

RADIOLOGICAL TREATMENT OF CANCER.

RECOMMENDATIONS ON STANDARDS AND TECHNIQUE.

A FORTNIGHT ago[1] we drew attention to the recent work of the Cancer Commission of the League of Nations in connexion with the radiological treatment of malignant disease. The Commission felt that the great publicity now being given to radiotherapy, and the elaborate and costly apparatus and arrangements required for its practice, demanded a collection of international experience. They therefore appointed a subcommission consisting of Prof. C. Regaud (Chairman), Sir George Buchanan (Chairman of the Cancer Commission, ex-officio), Mr. Comyns Berkeley (London), Prof. A. Döderlein (Munich), Dr. J. Heyman (Stockholm), Prof. W. Lahm (Chemnitz), Prof. E. Pestalozza (Rome), and Prof. A. H. M. J. van Rooy (Amsterdam). Dr. Janet Lane-Claypon was appointed special investigator, and the subcommission was charged to report upon: (1) the radiotherapeutic methods which can be regarded as of established utility for the treatment of cancer of the cervix; (2) the possibility of presenting radiotherapeutic results statistically; and (3) the principles which should be accepted to ensure most effective organisation of radiotherapeutic treatment of uterine cancer and to avoid dangers as far as possible.

The Commission met three times during the year 1928-29, and appointed Prof. F. Voltz, Dr. A. Lacassagne, and Dr. Heyman, together with Dr. E. Tomanek (the Secretary of the Commission), to prepare special reports from the clinics of Munich, Paris, and Stockholm. These reports are published in the volume just issued.[2] As we have already noted, the work entrusted to Dr. Lane-Claypon was a statistical study of the results supplied by the three institutes. She spent much time and labour on an attempt to draw conclusions as to the relative value of different methods of treatment, but she found that the three clinics had not followed the same principles in classifying the different forms of utero-vaginal carcinoma, that they had not adopted the same grouping of different stages, and that the methods in use over a number of years had varied even in the same clinic.

[1] THE LANCET, August 3rd, p. 235.

[2] League of Nation's Publications: Health. 1929. III., 5. Pp. 82. Obtainable from Constable and Co., Ltd., London, W.C.

The Commission concluded that no fair correlation of the work of different clinics could be made with the material at present available; its recommendations are designed to ensure a happier result from future inquiries.

Rules for Obtaining Full and Comparable Statistics.

The three institutions submitting reports have agreed to accept a model case-record drawn up by the subcommission (see Figure) and to follow certain rules laid down. The Commission hopes that all radiological institutes will adopt this scheme.

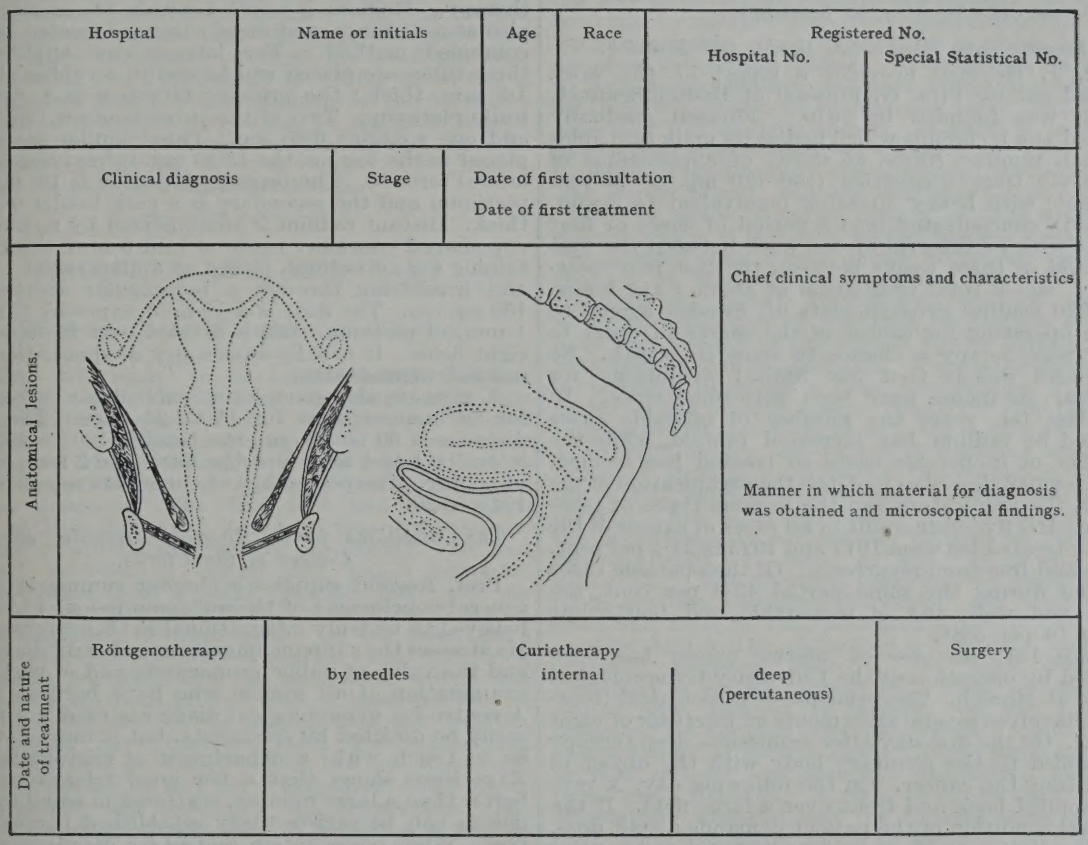
Only cases microscopically diagnosed should be included; adenoma, pre-cancerous conditions, sarcoma of the body extending to the cervix, the distinction is of theoretical rather than of practical importance. These growths behave like, and should be classed as, growths of the body unless the microscopical picture forbids.

The stages of anatomical extent are given as follows.

Stage I.—The growth is strictly limited to the cervix uteri. Uterus mobile.

Stage II.—Lesion spreading into one or more fornices with or without infiltration of the parametrium adjacent to the uterus, the uterus retaining some degree of mobility.

Stage III.—(*a*) Nodular infiltration of the parametria on one or both sides extending to the wall of the pelvis, with limited mobility of the uterus or massive infiltration of one



Model case-record card. The front of the card also leaves room for details of accessory treatment, whilst the back is devoted to results. The elaborate particulars of treatment to be entered under the various headings are set out at length in the report.

coma, and other non-carcinomatous growths must be differentiated. Growths are to be divided into vaginal, cervical, and corporal as before. A growth should be classed as vaginal only when the cervix is intact, and there is no ground for supposing that it is anything but a primary growth in the vagina. Cases in which a small cervical lesion has disappeared under radiological treatment, while the main part of the tumour is still in the vagina, are to be classed as vaginal. When the cervix has not been examined at the beginning of treatment, diagnosis must be postponed until the situation has been clarified. If, even after radiological treatment, the cervix cannot be examined, the growth should be classed as vaginal if rectal examination shows the cervix and parametria to be clinically free from growth. Carcinoma of the body should be diagnosed only when the cervix is healthy. In the absence of sufficient indications for determining the point of origin, the microscopical report should provide a reasonably safe basis for diagnosis—e.g., pure squamous-celled carcinoma and adeno-carcinoma with mucous secretion are both cervical types of growth. If the cavity of the uterus is enlarged and clinical examination does not differentiate between endocervical carcinoma extending to the body and parametrium with fixation of the uterus. (*b*) More or less superficial infiltration of a large part of the vagina, with a mobile uterus. (*c*) Isolated metastases in the pelvic glands, with a relatively small primary growth. (*d*) Isolated metastases in the lower part of the vagina. Generally speaking, all cases not falling into Stages II. or IV. to be placed under Stage III.

Stage IV.—(*a*) Cases with massive infiltration of both parametria extending to the walls of the pelvis. (*b*) Carcinoma involving the bladder or rectum. (*c*) The whole vagina infiltrated (rigid vaginal passage), *or one vaginal wall infiltrated along its whole length with fixation of* the primary growth. (*d*) Remote metastases.

For statistical purposes, only cases of cervical carcinoma which have been under observation for at least five years should be included, grouped into (*a*) those treated in the first instance by radiotherapy; (*b*) post-operative recurrences and cases treated by palliative operation; (*c*) those treated by post-operative prophylactic irradiation. Records should also include the total number of patients seeking treatment for cervical carcinoma and the numbers accepted and rejected together with the reasons for rejection, specifying whether it was the general condition or complications, lack of accommodation, refusal to undergo treatment or failure to keep

appointment, radiological treatment elsewhere, or any other reason. Clinical diagnosis should be confirmed microscopically, and the number of cases in each of the different stages should be stated among all those accepted for treatment and among those with no signs of the disease five or more years after treatment. Recurrences after total hysterectomy should be classified as local recurrence in the scar, or as distant recurrence. In setting out the results of the treatment, no deduction should be made for patients whose treatment was interrupted or who died or were lost sight of during the first five years after treatment. Figures should be based on the number of cases treated and not on the number examined.

Detailed instructions are given in the report for supplying data relating to technique.

Reports from Stockholm, Paris, and Munich.

Dr. J. Heyman provides a report of the work carried out by Prof. G. Forssell at Radiumhemmet, which was founded in 1910. Forssell gradually arrived at a technique which had as its main principles a small number (three at most) of applications of relatively large quantities (100–120 mg. of radium element) with heavy filtration (equivalent to 3 mm. of lead), concentrated into a period of three or four weeks with an interval of one week between the first two and of three weeks between the last two treatments, and a total irradiation of about sixty hours. In 1920 leading gynæcologists of Sweden agreed to cease operating for cancer of the cervix in order to give radiotherapy a chance to show its worth. So successful was it that few radical operations for cervical carcinoma have been performed since. In the last ten years the number of operable cases treated by radium has increased tenfold, while the number of inoperable cases so treated has trebled. Dr. Heyman describes in detail the organisation of the clinic, the applicators and the various types of technique. His five-year result in all cases of cancer of the cervix treated between 1914 and 1923 is 23·1 per cent. alive and free from recurrence. Of the operable cases treated during the same period 43·6 per cent. are alive and well, and of inoperable and border-line cases 16 per cent.

Since 1913 no case of uterine cancer has been treated by operation at the University Gynæcological Clinic at Munich. The principle of radiological treatment involves several treatments at intervals of eight weeks. On the first day after admission, deep therapy is applied to the pituitary body with the object of sensitising the cancer. On the following day, X rays are applied back and front over a large field. If the general condition of the patient demands a split dose, the irradiation is given on two or three consecutive days. The tubes used are run at 200 kilovolts and 2·5 milliampères, and the rays are filtered through 1 mm. of copper. The pituitary areas receive 30 per cent., and the uterine areas 90 per cent., of an erythema dose. On the day after X ray treatment the patient rests; the next day is occupied by any necessary surgical measures—biopsy, fulguration, cauterisation, or cataphoresis—and after another day's rest radio-active substances are applied. The primary filtration is 0·2 mm. of silver; 1 mm. of brass and a layer of thin rubber are added for radio-active substances placed within the womb. The maximum dose is 1400 mg.-hours. Usually 55 mg. radium element are left in for 24 hours. After another day's rest, the patient leaves hospital on the ninth day. Eight weeks later the patient returns for six days, and the treatment is repeated with the omission of the pituitary irradiation. If a third treatment is considered necessary, the second scheme is repeated eight weeks later. Of the operable cases treated between 1913 and 1923, 50·2 per cent. were cured; of the border-line cases, 28·3 per cent.; and of the inoperable cases, 10·7 per cent. The crude survival rate for the whole series is 18·2 per cent. Analysis of the figures shows that the results are much better if X rays are combined with radio-active substances; that the best results are obtained after the thirty-fifth year of life; that the end of the third year after treatment shows well enough what the later results are going to be; and that the poorer classes of the community have a much lower survival rate than the well-to-do. Prof. Voltz lays stress on the importance of systematic treatment and the accurate completion of the plan when once determined. He also sees the possibility of improved results from better after-care of poor patients. He describes the organisation of his clinic, and illustrates his apparatus with some excellent photographs.

Radio-active bodies were first used in Paris for cancer in 1919. Dr. Lacassagne surveys the history of the work, the present organisation of the service, and the conditions which affect the efficacy of radiotherapy. Radium is applied within the cavity and also at a distance, and most cases are treated by the combined method. For intra-uterine application, three tubes are placed end to end in a rubber sheath 1·5 mm. thick; the primary filtration is 1 mm. of iridio-platinum. Two of the tubes contain 13·33 mg. and one contains 6·66 mg. Three similar tubes are placed in the vagina, the 13·33 mg. tubes lying in the lateral fornices. The primary filtration is 1·5 mm. of platinum and the secondary is a cork holder 0·5 cm. thick. Distant radium is administered by means of a cup-shaped container made of lead 6 mm. thick containing 4 g. of radium, placed at a distance of 10 cm. and irradiating through a rectangular aperture of 150 sq. cm. The dose is a 10-hour exposure through 1 mm. of platinum, and is divided over 25 days and eight fields. It usually causes dry desquamation and marked pigmentation.

X rays are also given in intensive doses twice daily for an hour or more for 15 to 25 days. The total distance is 60 to 80 cm., the tension 180 to 200, the intensity 4 to 5 ma., and the filter 1 to 2 mm. of zinc or copper. The percentage of cures between 1919 and 1923 is 20.

The Conditions for an Effective Campaign against Cancer of the Uterus.

Prof. Regaud supplies a chapter summarising the general conclusions of the subcommission, which are believed to be truly international in their application. He stresses the supreme importance of early diagnosis, and the value of public propaganda and of periodical examination of all women who have borne a child. A centre for gynæcological diagnosis need not necessarily be directed by specialists, but it must have, or be in touch with, a department of micropathology. Experience shows that a few good laboratories are better than a large number, scattered in small towns; liaison can be satisfactorily established through the post. While consultation centres for diagnosis should be numerous and easily accessible, treatment centres should be few, and it is important that the diagnostic clinic should not become a radium institute.

"For those who have not reflected on the amount of knowledge and experience lying at the back of apparently simple actions," writes Prof. Regaud, "the manipulation of radium and rontgenotherapy seems so easy that many are tempted to adopt the treatment in their own practice without undergoing the necessary preparation for the work. Individual surgeons and gynæcologists, in private practice or running small clinics, constitute themselves the radiotherapeutists of their patients. Some radiologists, more familiar with radiodiagnosis than with cancer and gynæcology, undertake the treatment of uterine cancer."

He points out that no such assumption of operative ability could be made, and foreshadows the great difficulty in proper organisation of radiation treatment which will be caused by this attitude on the part of practitioners, and the public assent given to it through ignorance. He deprecates the supply of radium—which may be insufficient in quantity or contained in out-of-date apparatus—to small local hospitals, and the hire of radium by practitioners who order it as they would a drug. The abuse of X rays is, he thinks, less harmful than the abuse of radium.

"The mischief of bad rontgenotherapy lies not so much in that it deprives patients of treatment by other methods which might cure them, as that it deprives internal radium

therapy of a valuable ally, which might help to increase considerably the number of patients capable of being cured."

The subcommission recommend the concentration of treatment of cancer of the uterus in a small number of perfectly equipped institutions. It desires to draw the attention of the various authorities concerned to the disastrous results which might arise either by encouraging, or by allowing without any control, the widespread use of radiotherapy for the treatment of cancer, notably cancer of the uterus, in the hospitals or institutions which are maintained by public authorities. Without being able to express a dogmatic opinion on methods of technique, about which specialists still disagree, the Commission wishes to warn medical men and the public against the use of insufficient quantities of radium—the few needles or one or two tubes with which practitioners and small clinics sometimes attempt to treat patients. It insists on the difficulty of providing an effective and harmless deep pelvic irradiation, on the necessary strength of machines and tubes, on the great labour necessary for efficacious treatment, and on the obligation resting on doctors not to allow radiotherapy to pass into unskilled hands.

MEDICINE AND THE LAW.

Dangerous Drugs Regulations: Keeping a Register.

THERE still seems to be some misunderstanding about the obligation to keep a register under the Dangerous Drugs Regulations. A medical practitioner was fined 10 guineas including costs at Manchester on August 7th for failing to keep a register and to enter therein the true particulars of the drugs named in the summons. The defendant had undertaken work at Hull last April, as locum tenent during the absence of a local practitioner on holiday. He had ordered tincture of opium and liquid morphine hydrochloride from a local chemist, but made no entry of these purchases though there were 15 entries in the day-book of drugs used. On the defendant's behalf there was produced in court a small handbook containing particulars of the purchases, and it was apparently common ground that, if these particulars had been entered in the dangerous drugs register, they would have complied with the regulations. Defendant said he considered he had no other book to keep because he had never dispensed drugs above the strength laid down by the regulations. The Hull stipendiary magistrate, in imposing a fine as already stated, held that the statute required the keeping of a proper record of where the drugs came from and what became of them.

Section 7 of the Act of 1920 expressly authorises the Home Office to make regulations requiring persons engaged in the manufacture, sale, or distribution of drugs within Part III. of the Act to keep such books as may be prescribed; it would thus hardly be possible to argue that the regulations were ultra vires. The consolidated regulations, issued afresh last December, contain specific provisions as to the form of the register and the time and method of making entries therein; but there is a special exemption for any duly qualified medical practitioner who "enters in a day-book particulars of every drug or preparation supplied by him to any person, together with the name and address of that person and the date of supply, and enters in a separate book kept for the purpose of this regulation a proper reference to each entry in the day-book which relates to the supply of any drug or preparation."

In the recent proceedings at Hull, instituted by the Director of Public Prosecutions, the prosecuting solicitor mentioned that when the resident practitioner returned from his holiday he found nothing remaining in the surgery of various quantities of tincture of opium, liquid morphine, and morphine tablets which had been left there at his departure. From the necessarily abbreviated report of the case it is not clear how far this statement was relevant to the summons, but apparently there was no sufficient record of the disposal of these drugs. Practitioners, when making holiday arrangements with a locum tenent, will bear in mind the desirability of taking steps to avoid the chance of misunderstanding in such circumstances.

Falsification of Prescription by Addict.

The Dangerous Drugs Acts and similar legislation cannot prevent every danger of abuse of drugs. Poisonous disinfectants are readily purchasable by would-be suicides. Last month a mother (found by the jury to have been "guilty but insane") poisoned her child by administering two dessertspoonfuls of a liquid consisting of a pint of water in which she had dissolved 300 aspirin tablets. Nevertheless, the Acts, so far as any legislation can, make things more difficult for those who would make improper use of drugs, and especially for the drug addict. In another case last month the evidence disclosed a long story of attempts to obtain drugs illegally; the case ended in prosecution and imprisonment, and the defendant will have a chance in prison of curing himself of drug addiction against which, it was said, he had made a good fight. The accused man, Leslie James Stonelake, aged 34, charged at Marlborough-street on July 14th, was stated to have been in April last an assistant engineer in a ship sailing from Australia to London and to have been treated on the voyage by the ship's doctor for asthma and drug addiction. The doctor succeeded in reducing Stonelake's drug consumption from 15 grains to half a grain a day. When the ship reached London at the end of the month, the doctor gave him a prescription for one tablet of hyoscine and one tablet of morphine sulphate; the total amount in the tablets was half a grain, and the prescription was marked "Not to be repeated." Stonelake presented the prescription to a Piccadilly chemist on May 6th, having altered "¼" into "½" and "1" in each case into "12." The chemist, believing the prescription to be genuine, furnished the drugs. On April 27th, 28th, and 29th he had presented prescriptions from another doctor who authorised a "repeat" and had obtained morphine thereby. On April 30th he presented a further prescription from yet another doctor and obtained 24 tablets; on May 11th he presented yet another prescription from a fresh doctor and obtained 24 tablets again. These large supplies at last aroused the chemist's suspicions, and the prosecution followed. A member of the staff of the Marylebone Hospital said the accused came to him from a nursing home which he had left for want of money to continue the treatment there; he was treated with daily reduced doses till June 19th when he ceased to take morphine; he had taken none since. The witness said the defendant had put up a good fight against the drug and could be cured; he had little of the physical or mental degeneration which usually accompanied such cases. The magistrate, Mr. Mead, sentenced the accused to three months' imprisonment in the second division on the charge of being in unauthorised possession of 12 grains of morphine sulphate (under the altered prescription) and dismissed the charge of procuring the drug on May 6th. The accused had, of course, committed several offences; there was also the element of forgery, but with this the magistrate could not himself deal; it was clearly unnecessary to commit the man for trial. The case shows the administration of the law in the best interests of the accused.

Medical Titles.

So far as it is a personal matter, Lieut.-Colonel Kynaston is to be congratulated on the success of his recent appeal to the London Sessions. The upshot of the decision is that he has committed no offence against the Medical Act in continuing to use the title, "M.R.C.S. (Eng.)," though the Royal College has taken that title away. Apart from the personal aspect

of the case, the consequent inconvenience is remarkable. Parliament declared in 1858 that it was expedient that persons requiring medical aid should be enabled to distinguish qualified from unqualified practitioners. The expediency is no less obvious to-day, and, though no steps have been taken to debar the unqualified doctor from practising, Parliament not long ago gave effect to the principle that dentists, at any rate, must not practise unless duly qualified. The Medical Act of 1858 established a clear test of the qualified practitioner—namely, statutory registration. Registration under the Medical Act depends upon the possession of certain statutory qualifications scheduled to the Act, and from time to time extended. If the question can be dissociated from any personal application, and can be discussed as an abstract matter of general interest, is the present position right or wrong? If a doctor forfeits his registration, and forfeits also the qualifying titles bestowed upon him by the Royal Colleges, then, however innocent and estimable his motives, however perfect in law the recent finding of the London Sessions, is it fair to the public that he should continue to assert titles which he no longer possesses? If the statutory scheme of registration is not vigilantly followed, if a man may claim qualifications merely because he thinks he ought to have them, what becomes of the protection which the Medical Act was designed to afford to "persons requiring medical aid"? The next step will presumably be that some practitioner who, upon conviction of felony or misdemeanour, has had his name erased from the Medical Register, and his qualifying titles taken away, will continue to assert his lost qualifications on the ground that he bona fide believes he was wrongly convicted.

Colonel Kynaston was prosecuted for "wilfully and falsely" using the title of "M.R.C.S. (Eng.)," thereby implying that he was registered under the Medical Act. At Marlborough-street Mr. Cancellor found the charge proved but dismissed the summons under the Probation of Offenders Act with a warning that, if the defendant persisted in using the designation, he would render himself liable to substantial penalties. In so far as the wording of the charge suggests any element of fraud, it is a suggestion which the prosecution expressly disclaimed. But it is apparently on the question of motive that the appeal succeeded. The chairman of the Sessions Court said that, in view of the defendant's highly distinguished career, the court thought it extremely unlikely that he would act from dishonest motives. He also said that Colonel Kynaston's claims were a matter which should perhaps be tested before a civil, not a criminal, tribunal. The Sessions Court presumably had no judicial knowledge of the terms in which the Lord Chief Justice lately decided against Colonel Kynaston's application to a civil tribunal. During the recent appeal the appellant told the Bench that the public did not care twopence whether he was an M.R.C.S. or not. If this be really true, some members of the public will wonder why he uses the title.

IRELAND.

(FROM OUR OWN CORRESPONDENT).

The Health of County Kildare.

ONE of the first county medical officers to be appointed in Ireland, Dr. J. A. Harbison, M.O.H. for the county of Kildare, has recently presented his first annual report. He points out that Kildare is an inland county with an area of 418,644 acres, and a population (in 1926) of 58,028. The birth-rate in 1928 was 26 per 1000 of the population, the illegitimate rate being 5·3 per cent. of the total birth-rate; the general death-rate was 14·8 per 1000 of the population; the death-rate from tuberculosis 1·5 per 1000, and from cancer 1·1 per 1000; and the infant mortality 23·3 per 1000. The marriage-rate was 4·2 per 1000.

School medical inspection has been successfully inaugurated; antituberculosis and infant welfare schemes have been revised and improved; inspection of midwives has been initiated; sanitary inspection is now on a more regular basis, and arrangements have been made for the collection of vital statistics. The county is divided into 19 dispensary districts, each with a part-time medical officer, appointed under the Medical Charities Act, to look after the sick poor of the district, and this officer is also given at the time of his appointment the post of part-time medical officer of health of the district. In each dispensary there is a part-time sub-sanitary officer, who has been, in most cases, the home assistance officer (formerly relieving officer), who is charged, irrespective of his previous training, with the duties of sanitary inspector for the district. This part-time system of sanitary inspection by officials without previous training, and with very meagre salaries, has not been found satisfactory in the scheme of coördination, and it is hoped, as a sufficient number of these part-time posts fall vacant, to replace them with a whole-time appointment.

Sanitary conditions on the whole in the county cannot be accounted as satisfactory, Dr. Harbison says. The provision of sewage systems is insufficient, and in two cases where they are provided proper use is not made of them. Some of the towns could and should have been provided years ago with an efficient sewage system. This was postponed, and the cost is now almost prohibitive. Considerable adjustment of the terms of financial assistance to local authorities will have to be made if the Board of Health is to extend the work of sewage provision in small towns.

AUSTRALASIA.

(FROM OUR OWN CORRESPONDENT.)

College of Surgeons of Australasia.

THE Fellows of the College of Surgeons of Australasia are distributed from Western Australia to New Zealand. For this reason, besides the annual meeting of the College as a whole, separate meetings are held in each State or Dominion. The South Australian State meeting is taking place at Adelaide on August 13th.

There have been a number of changes in the office-bearers of the College. For 1929 they include the following:—President: Sir Henry Newland. Vice-Presidents: Sir Alexander MacCormick and Sir Louis Barnett. Director-General: R. Hamilton Russell. Council: E. D. Ahern, R. Gordon Craig, H. B. Devine, A. L. Kenny, F. P. Sandes, and Ralph Worrall. Hon. Secretary and Treasurer: Alan Newton. The College intends to acquire offices of its own in all States and in New Zealand. The head office has been established at 6, Collins-street, Melbourne. A committee has been appointed to consider the hospital problems of Victoria, and when experience has been gained from the work of this committee the executive hopes to establish similar committees in the other States and in the Dominion.

Hospitals in Queensland.

Under Queensland's present hospital system, the State is divided into a number of areas, all the hospitals in which are under the Hospital Board. Sixty per cent. of the revenue for their upkeep is provided by the Government and the remainder is raised from local sources. The Brisbane and South Coast Hospitals Board has under its control the Brisbane general hospital, children's hospital, women's hospital, infectious diseases hospital, and obstetric hospital. Dr. McLean is the General Medical Superintendent of all the Board's hospitals, each of which has its own superintendent. There is also a general matron

The Board wishes to establish these hospitals as a centre, the outlying hospitals doing the general work and referring the special work to the main centre. As the Brisbane General Hospital is somewhat out of date the Board are rebuilding and remodelling it, and it is proposed to build a new hospital to replace the Obstetric Hospital. In the remodelled General Hospital, special complete departments will be established among others for urology, ophthalmology, ear, nose, and throat work, and orthopædics. Each of these departments will be a complete and separate unit. It is hoped to establish later a complete cancer department. A radium department is already in existence, about half a gramme of radium having been lent by the Commonwealth Government for the purpose.

The Pan-Pacific Surgical Conference.

The Pan-Pacific Surgical Conference is being held under the auspices of the Pan-Pacific Union from August 14th to 24th, at Honolulu. The Conference has been organised by Hawaian committees under the general chairmanship of Dr. Nils P. Larsen, and by Pacific Coast States and British Columbian committees under the chairmanship of Dr. George W. Swift. There are 16 sections whose programmes are entirely American, and several symposiums will be prepared. The invitations have been sent to many countries and ten delegates from each Pacific country are being housed and entertained by the committee in Hawaii. Australian delegates are Sir James Barrett, R. H. Pulleine, N. D. Royle, S. Harry Harris, R. P. W. Francis, and Prof. Watson. It is possible that Prof. W. A. Osborne will also attend as a delegate. The objects of the Conference are: to bring together surgeons from countries bordering on the Pacific; to permit the exchange of surgical ideas and methods; and to develop an "acquaintanceship among the surgeons."

UNITED STATES OF AMERICA.

(FROM AN OCCASIONAL CORRESPONDENT.)

The American Medical Association.

THE eightieth annual convention of the American Medical Association was held at Portland, Oregon, from July 8th–12th. The report of the Board of Trustees records that the Spanish edition of the Association's *Journal* was discontinued after the edition of Dec. 15th, 1928. A number of the South American subscribers transferred their allegiance to the English edition. The special technical journals have all enjoyed an increase in circulation, while the popular magazine *Hygeia* has continued to gain and is now on a self-supporting basis. The fact that it reaches monthly nearly 15,000 school teachers gives an idea of its educational influence in this country. The Bureau of Health and Public Instruction has been responsible for a number of radio lectures broadcasted from Chicago. Some of these health talks have been mimeographed and are available at the offices of the Association.

The Committee on Scientific Research reported expenditure during the year of over $12,000 on grants for research. Except in a few cases this money was devoted solely to necessary expense in connexion with research. The Committee on Trachoma among the Indians recommended that all matters relating to the health of the Indians ought to be transferred to the United States Public Health Service "which has a record of efficiency that is in striking contrast to the dismal failures of the Indian Service." Their investigations had shown them that trachoma is not being treated with any thoroughness, that children with this disease are present in all the schools which they visited and mingle freely with healthy children, thus spreading the infection. They add that "almost none" of the hospitals come up to the standards set by the American Medical Association or the American College of Surgeons.

The subject of fee-splitting was dealt with frankly in the report of the Judicial Council. Some physicians have attempted to find a qualified defence of this practice in the wording of a sentence in the Association's Principles of Medical Ethics, which says that "it is also unprofessional to divide a fee for medical advice or surgical treatment, unless the patient or his next friend is fully informed as to the terms of the transaction." In order that the intention of this section should be expressed in unequivocal language the Judicial Council recommended an amendment to read: "When a patient is referred by one physician to another for consultation or for treatment, whether the physician in charge accompanies the patient or not, it is unethical to give or to receive a commission by whatever term it may be called or under any guise or pretext whatsoever." This amendment was warmly endorsed during the convention by the Reference Committee on Legislation and Public Relations and was adopted by the House of Delegates at its second session. The House also adopted a resolution disapproving the recent change in policy of the American Red Cross permitting their nurses to serve patients under the care of osteopaths and chiropractors. At the final meeting opposition was raised against a Bill now before the U.S. Senate Committee, which seeks to impose prohibitive tariffs on foreign surgical instruments, X ray equipment, vacuum tubes, valve tubes, and scientific glassware. It was pointed out that these proposals, if adopted, would add materially to the already high cost of medical care. The resolution was referred to the Board of Trustees.

Public Health Services.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

CITY OF LONDON.

Statistics.—The estimated population of the City was 11,430, which gives a density of 17·3 persons per acre, as compared with about 60 per acre for the County of London. The resident population has steadily declined from 112,063 in 1861 to the present figure. The births numbered 82 and the deaths 140, giving a birth-rate of 7·2 and a death-rate of 12·2. The deaths from pulmonary tuberculosis numbered 13, from other tuberculous diseases 5, from cancer 16, from heart disease 31, from bronchitis 6, from pneumonia, 7, from other respiratory diseases 6, and there were no deaths from influenza. The corresponding rates were tuberculosis 1·57, cancer 1·4, heart disease 2·7, and respiratory diseases 1·7. The five infant deaths gave an infant mortality-rate of 60, and there were three deaths between 1 and 5 years. That one cannot make deductions from the rates for a small population is well illustrated by the fact that Dr. W. M. Willoughby records no deaths from childbirth, whilst in the comparative table for the London boroughs in the County report the childbirth mortality for the City is given as 12·05, evidently calculated on one childbirth death. The small number of births enables a close personal touch to be maintained between the infant welfare centre at St. Bartholomew's Hospital and the city mothers.

Infectious and Other Diseases.

The great majority of the notified infectious diseases were removed to hospital; thus out of 57 only one case each of scarlet fever, erysipelas, ophthalmia neonatorum, and pneumonia was treated at home. There were no notifications of puerperal fever or pyrexia, and there was no call made on the funds set aside for the nursing of measles, influenza, &c. Dr. Willoughby favours the notification of acute rheumatism in children under 16 years and the establishment of supervisory centres for such in London. The new

London regulations for infectious diseases came into operation on Jan. 1st, 1892. Trench fever has been removed from the list. Cases of malaria, induced therapeutically, need not be notified unless the practitioner in charge thinks that the patient is liable to relapses. In the case of enteric fever and dysentery steps must be taken to protect food against contamination by carriers. The question of bakers' itch came under consideration because one of the metropolitan boroughs sought powers enabling its medical officers of health to enter a bakehouse and examine the staff with a view to the detection of such skin diseases. Dr. Willoughby points out that "bakers' itch" is an indication of the excessive presence of worm- and insect-infested flour at the source of supply or at the bakehouse, and that he felt compelled to advise his Committee against the support of such piecemeal legislation. He thinks this should be merged in the larger subject of disease and cleanliness in relation to all foodstuffs, which is at present under the consideration of the Ministry of Health. The hours of the tuberculosis dispensary, established at St. Bartholomew's Hospital, have been rearranged with advantage. Wards are available for the reception of cases presenting difficulties of diagnosis, and the patients treated include residents of the City and workers in the City. The attendances show a decline owing to the removal of chronic cases as the result of the demolition of the Hutchison-avenue property. The corporation have made arrangements to maintain infectious advanced City cases at St. Columba's Hospital, Swiss Cottage. More use has been made of artificial pneumothorax. The tuberculosis dispensary has been put at the disposal of the College of Nursing for the training of health visitor students. In connexion with the V.D. clinic, also at St. Bartholomew's, in-patient treatment has been discontinued in the interests of economy. The number of cases discharged after completion of treatment was 7, and the number of cases who ceased to attend before final tests was 23 before completing the first course, 13 after one or more courses, and 23 after completion of treatment. Of the 476 venereal cases treated during the year, 445 were residents of London, and the remainder lived in the counties of Essex, Herts, Surrey, and Kent.

Atmospheric Pollution.

Records of atmospheric pollution by the analysis of rain-water are kept at Golden-lane, and a table is given showing the comparison, month by month, between Golden-lane and the Meteorological Office, South Kensington on the West and Victoria Park on the East. During most months of 1928 Golden-lane was considerably worse than the western station and very much worse than Victoria Park. In May, however, the western and eastern stations were about the same and Golden-lane nearly twice as bad. In July the Meteorological Office was much the best. In September the Meteorological Office was slightly better than Victoria Park, while Golden-lane was fivefold worse. In December the Meteorological Office and Golden-lane were each about twice as bad as Victoria Park. An observation is also made every midday at the Guildhall by a modern dry method. It was found that during the year the noon impurity, varied from a half to 5 mg. per cubic metre of air, the latter figure including times of fog. Dr. Willoughby thinks the time is approaching when a bright, smokeless fuel will be generally available for open grates and the solution of the domestic smoke problem.

Milk.

Of 48 samples of milk examined for tubercle, 4 gave a positive result. In one of the 4 the follow-up at the farm revealed tuberculous udders. In 2 cases the follow-up was a failure and the fourth was being investigated at the end of the year. Dr. Willoughby is impressed with the ease of application and the greater certainty of the intradermal test. He quotes figures showing that out of 835 non-reactors to the subcutaneous, 122 reacted to the intradermal test, and that the autopsy confirmed the result in all the 94 animals examined post mortem. He gives as advantages of the new tests: the veterinary surgeon's visits are reduced from 8 to 3; the tested animal need not be kept indoors; its milk yield is unaffected; the test is without risk to pregnant or young animals; and doping by tuberculin does not nullify the test, which can be successfully repeated at intervals of 3 weeks. On Oct. 1st, 1928, Article 29 of the Milk and Dairies Order, 1926, came into operation, according to which churns or vessels used for the transport of milk must bear the name and address of the owner in permanent marking and be provided with a lid without openings and so constructed as to prevent the access of dirt to the milk and the return to the interior of any milk which may have been splashed above the lid. Two prosecutions for milk deficient in fat, 13 per cent. and 26 per cent. respectively, were dismissed by the magistrate because he was satisfied that the milk was delivered as given by the cow. The veterinary officer, Mr. T. D. Young, who has recently paid a visit to Australia and New Zealand to inspect the meat industry in those countries on the invitation of their Governments, taking the meat industries of U.S.A. and Canada en route, reports on meat inspection.

Meat.

Argentina, during 1928, sent to us 470,000 tons of beef, 100,000 tons less than last year, but 76 per cent. of our imported beef. Australia sent 8 per cent. and Uruguay 6 per cent. New Zealand sent nearly 50 per cent. of our imported mutton and lamb, while Argentina sent 27 per cent., Australia 9 per cent., and Uruguay 7 per cent. New Zealand sent nearly half of the imported frozen pork, whilst the Irish Free State increased her shipments of fresh pork by 3500 tons. Denmark supplied 60 per cent. of our imported bacon and Holland 11 per cent. It was hoped that the removal of the embargo against Canadian cattle would increase our supplies of fat and store cattle, but this has not happened, because the Canadians have been able to obtain more money for such animals in Chicago. The Irish Government have passed a new meat inspection law under which meat inspectors will be appointed in Ireland in all places from which meat is exported to Smithfield. All the countries which export mutton and lamb to Smithfield are suffering loss from the condemnation of carcasses affected with caseous lymphadenitis—namely, Argentina, Australia, New Zealand, Chili, and Uruguay—and determined efforts are being made in every case by the Governments concerned to improve the method of examination of the carcasses and offal at the places of slaughter. Mr. Young mentions that Argentina has sent, experimentally, small consignments of "chilled" instead of frozen mutton, and that the appearances of these carcasses during the autumn and winter was so good that it was very difficult to distinguish them from home-killed mutton. The conditions under which meat has been handled and transported to and from the City markets improved greatly during 1928, and in the great majority of cases verbal caution as to thoughtless contraventions of the regulations was all that was required.

Housing.

Dr. Willoughby has made an inspection of all the dwelling houses in the case of which demolition might seem desirable, and he has formed the opinion that the housing question in the City is not now one which would justify the City Corporation in embarking upon any further housing schemes. The City pigeons were reduced by about 2000 during 1928.

Rats.

Dr. Willoughly states that there is a great decrease in the rat population, that owing to constant attention to drains and sewers the brown rat is fast disappearing and that as new buildings replace old the lessening in number of the smaller black rat will be apparent. Unfortunately, the owner is not responsible for the rat-proofing of buildings, which is a very expensive

matter. If the drains are out of order the owner can, of course, be called upon, and this is one effective way of reducing the number of brown rats. Examples of specifications for rat-proofing against the black rat are given in Dr. Willoughby's report and illustrate graphically the expense involved. Present observations suggest that the black rat in the City outnumbers the brown rat by 3 to 1. Poisons and viruses are not much used in the City. The traps which give the best results are the "breakback" and varnish traps—the latter being now in general use and the most successful of all. Some of the wire traps are constructed of wire so fine that captured rats can force their way out.

Tyne Port Sanitary Authority.

In his annual report to this authority Dr. W. E. Harker mentions that during 1928 9377 ships arrived, of which 8431 were inspected. Single cases of measles, mumps, and enteric fever were removed to hospital, but no cholera, plague, or yellow fever came to notice. Defects were noted in 607 ships (side ports defective in 318, water-closets in 122) and dirty accommodation for crews in 877—i.e., 12 per cent. of British and 6 per cent. of foreign ships. Uncleanliness is likely to develop at the end of a voyage, and in this connexion it has been pointed out that the crews of British ships are paid off in British ports, whereas foreigners are not. Except 800 tons of wheat sent to Rotterdam, the food imported was found in good condition. The aliens arriving were all clean. Treatment for venereal disease is offered to every ship on arrival; we are not told whether it is ever accepted. There is an official rat-catcher and on 67 vessels 2628 rats were destroyed, none of which were found to be infected with plague. On account of infection, 1957 beds were burnt. Fishing boats are inspected and 20 were cleansed and deodorised. The 18 water-boats were in good condition, and the water of 25 ships was changed; these also had their tanks purified.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED AUGUST 3RD, 1929.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 129 (last week 129); scarlet fever, 1776; diphtheria, 812; enteric fever, 50; pneumonia, 683; puerperal fever, 24; puerperal pyrexia, 98; cerebro-spinal fever, 13; acute poliomyelitis, 14; acute polio-encephalitis, 1; encephalitis lethargica, 30; dysentery, 6; and ophthalmia neonatorum, 115. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the Metropolitan Asylums Board on August 6th–7th was as follows:—Small-pox, 134 under treatment, 9 under observation (last week 161 and 9 respectively); scarlet fever, 1353; diphtheria, 1520; enteric fever, 12; measles, 314; whooping-cough, 295; puerperal fever, 23 (plus 13 babies); encephalitis lethargica, 122; "other diseases," 22. At St. Margaret's Hospital there were 17 babies (plus 9 mothers) with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns, including London, there were no deaths from small-pox, 5 (2) from enteric fever, 33 (4) from measles, 2 (0) from scarlet fever, 26 (3) from whooping-cough, 18 (6) from diphtheria, 60 (13) from diarrhœa and enteritis under two years, and 29 (1) from influenza. The figures in parentheses are those for London itself.

Three of the deaths from measles were reported from Stoke-on-Trent, 3 from Manchester, and 6 from Liverpool. Those from whooping-cough included 4 from Sheffield, and 3 each from Walsall, Birmingham, and Liverpool. Nine of the deaths from diarrhœa and enteritis under two years were recorded from Liverpool, 4 from Hull, and 3 each from Stoke-on-Trent, Birmingham, and Manchester.

The number of stillbirths reported during the week was 251 (corresponding to a rate of 36 per 1000 total births), including 42 in London.

Death from Small-pox.

Dr. Vynne Borland, medical officer of health for the metropolitan borough of Bethnal Green, informs us that in the fatal case of small-pox recorded last week the patient was an unvaccinated boy aged 13. On July 7th, the day after the rash appeared, he was taken to the South Wharf Hospital, Rotherhithe, and for the following details we are indebted to Dr. W. J. A. Coughlan, assistant medical officer in the River Ambulance Service. The patient was admitted with an attack of confluent small-pox, accompanied by severe toxæmia. He had suffered for eight years from suprapubic fistula, the result of an accident at the age of 4 years, which caused damage to the bladder and urethra. As a direct result of the attack of confluent small-pox a general septic condition supervened from which he died. "The fatal result in this case," writes Dr. Coughlan, "must be regarded as more directly due to the severity of the small-pox infection than has been the case in previous fatalities which have followed the existing mild form of the disease."

We understand that the cause of death was certified as septicæmia, confluent small-pox, and vesical fistula.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Comdr. H. B. Hill is placed on the Retd. List with rank of Surg. Capt.

Surg. Comdr. W. I. Gerrard is placed on the Retd. List at own request.

ROYAL NAVAL VOLUNTEER RESERVE.

Surg. Lt.-Comdr. G. McCoull to *Victory*, for R.N. Hospital, Haslar, for training.

Surg. Lts. G. H. Bradshaw, F. E. Stabler, and C. H. A. Fido (D.) to *Victory*, for R.N. Hospital, Haslar, for training.

ROYAL ARMY MEDICAL CORPS.

Capt. F. T. Boucher, late R.A.M.C., T.F., to be temp. Capt., and temporarily relinquishes the rank of Capt.

ARMY DENTAL CORPS.

Lt. I. A. Barlow to be Capt.

TERRITORIAL ARMY.

Lt.-Col. (Bt. Col.) P. J. Gaffikin, from T.A. Res. of Off., to be Lt.-Col. (Bt. Col.).

Maj. F. H. White, having attained the age limit, retires and retains his rank, with permission to wear the prescribed uniform.

INDIAN MEDICAL SERVICE.

Maj. M. Purvis retires.

Lt. (on prob.) J. Acheson to be Capt. (prov.) (on prob.).

DEATHS IN THE SERVICES.

Colonel Alfred Peterkin, C.B., A.M.S., retired, who died at Queen Alexandra's Military Hospital, Millbank, on July 17th at the age of 75, graduated in medicine at the University of Glasgow in 1878. He was a man of magnificent physique, and an old Rugby International, playing for Scotland. He entered the Army Medical Service as surgeon in 1880. In the following year he saw service in the Transvaal War, and in 1902 in the South African War, and received the Queen's medal and two clasps. As an administrative officer he was later employed in Mauritius, South Africa, and in London up to the time of his retirement in 1911. At the beginning of the late war he rejoined for service and was appointed to the charge of the London Command. He had an up-hill fight, as in addition to the ordinary army duties of his position, which in peace time were comparatively slight, he had to deal with five Territorial Hospitals, many private hospitals, the Territorial Units of the two London Divisions (amounting to over 60 Units), all of which, as well as the Guards and the Central Recruiting Depôt at Whitehall, were working briskly. After a short time crowds of wounded arrived, while medical officers were very scarce, and Peterkin dealt manfully with the situation as far as his responsibilities went. A steady, level-headed, and imperturbable officer, Colonel Peterkin was beloved by his juniors and thought much of by his seniors, and when he did not always see eye to eye with the authorities he carried out all orders loyally and thoroughly. He was made a Companion of the Bath during the war. Latterly he did some work for the Ministry of Pensions, and finally joined the Pensions Appeal Tribunals.

Correspondence.

"Audi alteram partem."

A MEMORIAL TO FERNAND WIDAL.

To the Editor of THE LANCET.

SIR,—The enclosed letter explains itself and I propose to do what these distinguished Frenchmen ask me. Will you kindly receive subscriptions for me and allow me to state that I should like myself to subscribe 3 guineas?

I am, Sir, yours faithfully,

ALMROTH WRIGHT.

St. Mary's Hospital, Paddington, August 13th, 1929.

Prof. ALMROTH WRIGHT.

MONSIEUR ET CHER COLLÈGUE,

Les admirateurs, les amis et les élèves du Professeur Fernand Widal ont décidé de former un Comité d'honneur pour perpétuer sa mémoire et répandre son œuvre scientifique. Dans ce but, ils ont l'intention de lui élever un monument, de faire figurer son effigie en médaillon à la Faculté de Médecine et à l'Hôpital Cochin et de publier une édition de l'ensemble de ses travaux.

Un certain nombre de nos collègues étrangers nous ont exprimé le désir de se joindre à nous et nous avons accepté avec joie leur concours.

Nous vous serions reconnaissants de bien vouloir prendre l'initiative de pressentir à ce sujet les personnalités de votre pays qui ont entretenu des relations avec le Professeur Widal et qui gardent pieusement son souvenir. Nous serions heureux de les voir se grouper autour de vous en un comité qui se chargera de recueillir les souscriptions et qui nous aidera dans l'accomplissement de la tâche que nous nous sommes proposée.

Veuillez agréer, Monsieur et cher Collègue, les assurances de notre considération la plus distinguée.

FERNAND BEZANÇON,
76, Rue de Monceau.
ANDRÉ LEMIERRE,
217, Faubourg Saint-Honoré.
PIERRE ABRAMI,
9, Rue de Lille.
MARCEL BRULÉ,
3, Rue Dufrénoy.
EDOUARD JOLTRAIN,
63, Avenue de Villiers.
LOUIS PASTEUR VALLERY-RADOT,
5, Avenue Constant Coquelin.

*** We have recorded this movement in an annotation on page 346. Subscriptions to the Fund can be sent to this office, addressed "Widal Memorial, care of The Editor, THE LANCET."—ED. L.

MILDER VACCINATION.

To the Editor of THE LANCET.

SIR,—It may be of interest if I give a short account of recent experience at Scarborough which bears closely on some of the questions raised in your leading article of August 3rd (p. 233).

Of late years there have been two outbreaks in the town, from October, 1924, to June, 1925 (45 cases), and from January, 1927, to March, 1928 (75 cases). The district is, and always has been, poorly vaccinated, the percentage of infants vaccinated in 1924 and 1925 being 30 in each year, but the vaccinal condition of those attacked affords good evidence of the protection afforded. In the first outbreak, out of 45 cases, 40 were unvaccinated, four were vaccinated in infancy, and in one case the vaccinal condition was unknown; the ages of the four persons vaccinated in infancy were 51, 36, 52, and 63 years. In the second outbreak, out of 75 cases, 67 were unvaccinated and eight were vaccinated in infancy, their ages being 25, 32, 46, 47, 48, 49, 50, and 56. These figures speak for themselves, but it will be noted that in 1927–28 the disease attacked patients as young as 25, who had been vaccinated in infancy, and this clearly points to the necessity of *recent* vaccination.

In the first outbreak, of the unvaccinated cases three were vaccinated by the medical officer of health after exposure to infection, but (as it proved) too late to stave off the attack. Vaccination must be successfully performed within three days of exposure to the disease, if the attack is to be averted.

As public vaccinator, I found much opposition to vaccination in Scarborough; only a small proportion take advantage of the conscientious clause on conscientious grounds, and the majority use it as a means of escaping the extra care entailed in attending to a vaccinated arm. Some still think that vaccination will cause the child to develop some other disease, chiefly tuberculosis. The percentages of vaccinations in infants (to births), quoted earlier, give no real idea of the vaccinal condition of the town before and during the two outbreaks. Thus my vaccination register shows that in F. School, out of 178 children vaccinated, 165 had never been vaccinated before; in S.M. School, out of 128 children, 112 had never been vaccinated before; in C. School, out of 225 children, 195 had never been vaccinated before; in the vaccination centre at E., out of 69 persons vaccinated, 52 had never been vaccinated before; and in the centre at S.S., out of 12 persons vaccinated, 8 had never been vaccinated before. The figures for the high school were much better; out of 56 vaccinated, 30 had never been vaccinated before.

During the two outbreaks a number of revaccinations were performed on children under the age of 10. Most of these were unsuccessful. Of the successful cases the majority showed no more than two scars of a previous vaccination. Incomplete vaccination, as shown by only one or two scars, means incomplete safety, but as the Rolleston Committee point out, multiple insertions may perhaps be reserved for those who desire to obtain the maximum protection at one stage. The instruction to public vaccinators by the Ministry of Health is not to revaccinate any child under the age of 10. The lowest age at which revaccination was successfully performed by me was 7 years. This suggests that during an outbreak of small-pox it is wise to revaccinate children of or above 7 years of age, even if they have previously been successfully vaccinated.

In your leading article you say that "it is probable that the lymph now in use is considerably stronger than necessary," and it is noteworthy that in both the Scarborough outbreaks a violent reaction was produced by vaccination in a large number of cases. This reaction is of special significance in the presence of the prevalent mild type of small-pox, since the vaccinal reaction was often more severe than the disease itself. Most cases of small-pox progressed well after the appearance of the rash, whilst many cases of vaccination were confined to bed for as long as a week. Some children were absent from school for two or three weeks. Cases of this violent reaction were chiefly children of school age, and I estimate the percentage as about 20. In most of them on the eighth day the arms appeared to be taking a normal course, but during the next two or three days this reaction had set in. Fever (with temperature often as high as 103° F.), delirium, headache, backache, vomiting, pronounced weakness, and vertigo were common. The arm showed a varying amount of inflammation, from red rings round the vesicles to severe cellulitis extending from the upper arm to the wrist, with redness and œdema. The axillary glands were greatly enlarged and very tender. Supernumerary vesicles were often seen, one child having eight and another ten vesicles from four scarifications. Herpes was frequent on the lips, and one child had

a patch of herpes on the breast and neck on the same side as the vaccination.

The same technique was employed in all my vaccinations, and all vaccinations were performed with Government lymph. In a number of cases modifications of the usual method were employed to discover, if possible, any factor which might have some bearing on the production of this reaction. Thus different antiseptics were used to cleanse the skin; the scarifications were made with varying severity, or only half the usual quantity of vaccine lymph was used. No such factor was discovered. It was observed, however, that infants of 4 or 5 months who were vaccinated during the outbreaks did not show the same violent reaction. From this it appeared that the actual presence of small-pox in school-children was an important factor in causing this violent reaction. I may here note that in the first outbreak of small-pox 50 per cent. of cases occurred in children of school age, whilst in the second outbreak the figure was 60 per cent.

A similar violent reaction occurred during the 1923 epidemic in Gloucester, and my experience at Scarborough indicates that in the presence of the present type of mild small-pox Government lymph is too potent. Unfortunately, in the words of the Rolleston Committee there is still "a great lack of information as to the minimal dose of lymph necessary to secure adequate immunity from small-pox."

I am, Sir, yours faithfully,

NATHAN WALSH, M.B., Ch.B.

Scarborough, August 9th, 1929.

MEDICAL EDUCATION.

To the Editor of THE LANCET.

SIR,—The report of Prof. T. J. Mackie's address on medical education, published on p. 298 of your last issue, affords food for thought. I believe that medical men underrate the biological concept of man, of brain + muscle, supported by a bony framework (the skeleton). Much in our teaching of physiology, anatomy, and psychology would benefit by a greater appreciation of this concept, and its corollary the physiological properties of thought. This question, of course, is a big one and is outside the scope of this letter, which is to suggest a few practical ways whereby the student's course can be shortened and simplified with advantage. My suggestions are :—

1. That the students after their first M.B., or its equivalent, be brought into the wards by their physiological teacher to perform the routine pathology of the wards—e.g., the blood-sugar and urea estimations, examinations of the urines, and blood examinations, &c.; and that they should go to all the elementary classes on bacteriology, morbid anatomy, morbid histology, &c., which they now attend after their second M.B. The students at this stage are not taught their clinical physical signs till after, we will say, nine months, but they might, of course, be shown the salient points of a case illustrating physiological or pathological problems. The pathologist (of the teaching staff) could then devote himself to the more difficult problems of pathology itself. The physiologist and the pathologist should oppose each other as counsel in law cases do to arrive at the truth, and each be mutually dependent on each other for his knowledge.

2. That all the present pass examinations should be abolished and the other examinations modified. Instead of them a class-mark should be given and a viva-voce examination held at the end, say, of every six months.

A clever student should be able to pass through the course more quickly than a dull one; as things now stand all students (except those that fail in their examinations) are reduced to the same level; they all pass the first M.B. together, they all pass the second M.B. together, and when they arrive in the wards they all have to start at the same level again; and at the end of their course (five years) not very much, it seems to me, is known of their abilities, or for what branches of the profession that they are fitted; a future researcher, for instance, may be caught young, and helped and educated for that purpose. The present faulty state of affairs was lucidly described in Prof. Lovatt Evans's address before the British Association at Glasgow last year (THE LANCET, 1928, ii., 535).

It seems to me that in our teaching of medicine we might well emulate the law (as mentioned before) in respect to its method of arriving at and of assessing the truth, thus obviating inter alia watertight compartments of knowledge.

I am, Sir, yours faithfully,

A. H. MILLER, M.D. Camb.

Bournemouth, August 9th, 1929.

EARLY TREATMENT IN ACUTE ANTERIOR POLIOMYELITIS.

To the Editor of THE LANCET.

SIR,—I do not think it would be superfluous to remind ourselves that an epidemic of acute anterior poliomyelitis is very liable to occur at this particular period of the year. It will be remembered that the epidemic of 1926 started that summer and reached its height during the drought. During that epidemic I saw over 150 cases, chiefly in Essex. I was fortunate enough to treat most of them from the very onset of the disease. This was at their own homes, or in fever hospitals, or at the various hospitals to which I am attached. In addition to the ordinary orthopædic treatment it was also possible to give suitable cases the serum from convalescent or chronic cases of the disease with encouraging results. History may be repeating itself, as I have already seen a number of acute cases within the last few weeks.

I would, therefore, plead that the orthopædic surgeon should be allowed to treat the patients, wherever they may be, in fever hospital or elsewhere, from the moment of the onset of the disease, thereby following out, to the minutest detail, the teaching of Sir Robert Jones that the affected muscles should have *immediate* complete and absolute rest in the orthodox positions necessary for optimum utility after the acute stage has passed.

I am, Sir, yours faithfully,

B. WHITCHURCH HOWELL.

Weymouth-street, W., August 7th, 1929.

THE LATE DR. MITCHELL BRUCE.

To the Editor of THE LANCET.

SIR,—I read with a sense of personal loss and keen regret of the death of Dr. J. Mitchell Bruce. I was fortunate enough in 1888 to be with him as a post-graduate at Brompton, and from his lips learned much that I have, year after year, transmitted to my students at the Jefferson Medical College of Philadelphia. The description of his character and methods in your notice of his death is excellent. Of him it may be said: Doctor et scriptor clarissimus, vir carissimus.

I am, Sir, yours faithfully,

Philadelphia, July 23rd, 1929. HOBART AMORY HARE.

AURAL DISEASE AND BATHING.

To the Editor of THE LANCET.

SIR,—My friend Dr. Graham Forbes in his kind reply to my letter in your issue of August 3rd gives an account of the tests employed for the purity of swimming-bath water, but he will not quarrel with me when I emphasise that the ultimate test is the clinical test. In this the consensus of specialist opinion seems clear: (1) that the metropolitan swimming-baths are a real source of danger; (2) that

open-air and sea-bathing appears less fraught with danger, from which it seems to follow that the contamination of the water is a matter of moment; (3) that the infecting micro-organism is a streptococcus. There are many loop-holes for error in the bacteriological testing of swimming-baths and the chemical purification of the water possibly by some untrained person. The clinical test remains, and I venture to think that a case has been made out for the scientific reinvestigation of the question with a view to finding the condition of affairs *at its worst.* I should be happy to think that perhaps such work might fall within the scope of Dr. Forbes's own official researches.—I am, Sir, yours faithfully,

August 12th, 1929. F.R.C.P.

Obituary.

EDWARD OCTAVIUS CROFT, M.D. DURH., L.R.C.P. LOND., M.R.C.S. ENG.,

LATE PROFESSOR OF OBSTETRICS IN THE UNIVERSITY OF LEEDS.

Edward Octavius Croft, who died at Headingley, Leeds, on August 7th, was the son of the late Charles Ilderton Croft, F.R.C.S., of St. Laurence Pountney, London, and received his education at University College, London, from whence he qualified with the double English diploma. The branch of medicine in which he later specialised was early indicated by his appointments as resident obstetric assistant to University College, London, resident medical officer to the General Lying-in Hospital, and registrar and pathologist to the North-Eastern Hospital for Children. When in 1885 a new department consisting of an out-patient and in-patient department for the diseases of women was instituted at the Leeds General Infirmary there was also started an extern department for midwifery, the first hon. officer of which was the late Dr. James Braithwaite; Croft being elected resident obstetric officer, the organisation of the extern midwifery department was then to a large extent left in his hands. Such a department was new to Leeds, where until that time the students had gained their experience in midwifery from private practitioners for the most part, and partly from the obstetric work in the workhouse infirmaries. Croft started on a course of reform with tact and vigour, and in a short time the midwifery training in Leeds assumed a new and much more satisfactory position. It is not too much to say that the department was mainly the result of his efforts, for Dr. Braithwaite, with full confidence, left the organisation in his hands.

In 1898 Croft graduated as M.D. Durh. and became demonstrator of obstetrics at the Yorkshire College, and in 1910 he was appointed lecturer in gynæcology in the University of Leeds and subsequently professor of obstetrics. He was also honorary consulting physician to the Workwomen's Convalescent Home at Ilkley, senior hon. surgeon to the Leeds Hospital for Women and Children, and hon. surgeon to the Leeds Maternity Hospital. He was a past president of the North of England Obstetrical and Gynæcological Society and also of the Leeds and West Riding Medico-Chirurgical Society, and acted as an examiner to the Central Midwives Board. Although he was not a prolific writer, he contributed to the transactions of the different societies dealing with the branch of medicine in which he was specially interested, and occasionally to our columns.

In private life Croft was a deservedly popular man. A colleague writes of him: "He was one of the straightest men I have ever met, absolutely honest in every way. An amusing companion, his ready sense of humour showed itself in the way in which he organised regularly the Christmas entertainments at the Leeds General Infirmary."

Medical News.

UNIVERSITY OF LONDON.—Applications are invited for the *William Julius Mickle Fellowship*, of the value of at least £200, which is awarded annually by the Senate to the man or woman who, being resident in London and a graduate of the University, has in the opinion of the Senate done most to advance medical art or science within the preceding five years. Applications must be made in proper form to the Principal of the University not later than Oct. 1st. Particulars may be had on application.

INTERNATIONAL MEDICAL CLUB OF NEW YORK.—Members of the medical profession who intend to visit the United States are informed by the International Medical Club of New York that one of the aims of the Club is to receive and direct such visitors during their sojourn. The objects of the Club are set out in a leaflet which can be obtained from the Chairman of the Liaison Committee, Dr. Fred H. Albee, 30, East 40th Street, New York City; they are briefly the promotion of social and academic relations between medical graduates in America and the establishment of a friendly and scientific union between the Club and organisations with similar aims in foreign countries. It is hoped to get into touch with representatives of medicine in all countries, and ascertain what post-graduate medical opportunities are in existence. The president of the Club is Dr. Jacques W. Maliniak.

DISEASES OF THE NERVOUS SYSTEM.—A post-graduate course on this subject will be held at the National Hospital, Queen-square, from Oct. 7th to Nov. 29th. The general course will consist of 32 clinical lectures and demonstrations at 3.30 P.M. each weekday, except Wednesday and Saturday. There will be teaching in the out-patient department on each weekday except Saturday at 2 P.M., and eight pathological lectures and demonstrations on Mondays at noon. A course of eight lectures on the Anatomy and Physiology of the Nervous System will be arranged on Fridays at noon if there are enough applicants, and 12 clinical demonstrations, chiefly on Methods of Examination of the Nervous System, will be given on Tuesdays and Thursdays at the same hour. Tickets entitling the holder to attend the out-patients clinic may be obtained, and a limited number of students can be enrolled as ward clerks. Application should be made to the Secretary of the Medical School, National Hospital, Queen-square, London, W.C.1.

MATERNITY INSTITUTIONS.—The Scottish Department of Health has approved of the Glasgow Corporation's proposal to build a new maternity hospital. The institution, which will accommodate from 100 to 150 beds, will provide treatment for patients who are unable to pay for nursing-home charges. A site has not yet been selected.—The annual report of the Maternity Centre for Holborn, Finsbury, and the City Border records a busy year. There are 420 mothers on the register, and the superintendent paid 1381 visits. Consultations by doctors dealt with 2296 mothers and 2824 children. The honorary physicians state that "there has been no very marked falling off" in the physique and nutrition of the children in consequence of the unsatisfactory economic conditions caused by unemployment and short time.

INTERNATIONAL ASSOCIATION FOR THE PREVENTION OF TUBERCULOSIS.—As we have already announced, the fifteenth annual conference of this Association will be held in the Connaught Hall, Newcastle-upon-Tyne, from Oct. 10th–12th. On the first day, after a formal opening of the Conference by the Lord Mayor, Mr. Henry Mess, Ph.D., will give an address entitled Tuberculosis on Tyneside: a Sociological Survey, and a discussion will follow. In the afternoon Dr. Edouard Rist, of Paris, will speak on the Factors that Produce Pulmonary Tuberculosis, a subject which will be discussed by Dr. A. F. Bernard Shaw, Dr. C. G. R. Goodwin, Sir Thomas Oliver, and others. On Oct. 11th Dr. William Brand will set out a Scheme of National Propaganda regarding Tuberculosis, and later Dr. A. H. Macpherson will give an address on Combined Treatment and Technical Education of Tuberculous Youths. In each case a discussion will follow. Other subjects to be considered include the Teaching of Tuberculosis to Undergraduates (introduced by Prof. Thomas Beattie and Dr. Fergus Hewat), the Training of Tuberculosis Medical Officers (Dr. W. H. Dickinson), Methods of Medical Propaganda regarding Tuberculosis (Dr. Harley Williams), and Dentistry in Relation to Tuberculosis (Dr. William Guy). The address of the Association is 1, Gordon-square, London, W.C. 1.

WORLD LEAGUE FOR SEXUAL REFORM.—The third International Congress of the World League for Sexual Reform on a Scientific Basis will be held at the Wigmore Hall, Wigmore-street, London, W. 1, from Sept. 8th to 14th. The hon. secretary is Dr. Norman Haire, and communications may be sent to him at 127, Harley-street, London, W. 1.

POST-GRADUATE COURSE IN NEUROLOGY AND PSYCHIATRY.—Under the auspices of the American Medical Association of Vienna systematic post-graduate classes in English will be held at Prof. Wagner-Jauregg's Neuro-Psychiatric Clinic and at the Neurological Institute of Prof. Marburg in the University of Vienna from Jan. 2nd to Feb. 15th, 1930. Further information may be had from Dr. E. Spiegel, Fakkestrasse 3, Vienna, I.

BRITISH SOCIAL HYGIENE COUNCIL.—Mr. L. S. Amery, M.P., late Secretary of State for Dominion Affairs and for the Colonies, has accepted the chairmanship of the Imperial and International Committee of this Council. It is stated that arrangements are being made for providing missionaries and other social workers who are going abroad with a knowledge of the problems of social hygiene. In this connexion a diploma course has been instituted at Aberystwyth University and others are in view.

INTERNATIONAL TRACHOMA PRIZE.—The Royal Hungarian Minister of Public Welfare and Labour offers a prize of 2000 Swiss francs for an essay embodying independent work on the ætiology of trachoma. Papers already published are eligible for the competition, and the judges may also consider work not submitted for competition, but published between July 1st of this year and June 30th, 1931. Essays may be written in German, English, French, Italian, or Hungarian, and should be sent to the Eye Clinic No. 1 of the Royal Hungarian Peter Pázmány University (Budapest, VIII., Mária-utca 39) not later than June 30th, 1931.

POST-GRADUATE COURSES IN FRANCE.—Dr. C. Laubry is to give a course on Diseases of the Heart and Vessels at the Hôpital Broussais, Paris, from Oct. 7th to 19th. Particulars from Mr. Thiroloix at the hospital. —From Nov. 4th to 16th Prof. Georges Mouriquand and his colleagues will hold a course in pædiatrics at the Clinique Médicale Infantile of the University of Lyons. Application should be made to the Secrétariat de la Faculté de Médecine, 18 quai Claude-Bernard, Lyon, before Oct. 25th.

DONATIONS AND BEQUESTS.—Mr. Francis James Hillier, of Queen's-road, Peckham, left £500 each to Sir William Treloar's Hospital for Cripples, St. Dunstan's Headquarters for Blind Sailors and Soldiers, and Dr. Barnardo's Homes.—Alderman Robert Harold Posnett, of the Mount, Moughland-road, Runcorn, Cheshire, left £500 each to the National Children's Home, Posnet House, Frodsham, and the Runcorn Cottage Hospital.—Mrs. Eliza Andrews, of Ardara, Comber, Co. Down, left £400 to the Comber Nursing Association, and £200 to the Royal Victoria Hospital, Belfast.—Mr. Michael Rogers Oldfield Thomas, of Edward's-square, Kensington, besides other bequests, left £3000 to the London Hospital.—Mrs. Margaret Inglis or Breen, of Broomhide House, Partick, Glasgow, left £2000 to the Royal Hospital for Sick Children for a "Margaret Inglis Breen Ward," and £1000 each to the Royal Infirmary, Glasgow, The Western Infirmary, Glasgow, and Victoria Infirmary, Glasgow.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.—Courses will be in progress for another week at the All Saints' Hospital (urology) and at the Queen's Hospital for Children (pædiatrics). The former is an afternoon and evening course and the latter lasts all day. Special courses in the following subjects will be given during September: diseases of the chest, Brompton Hospital, Sept. 9th to 14th; diseases of infants, Infants Hospital, Sept. 9th to 22nd; psychological medicine, Bethlem Royal Hospital, Tuesday and Saturday mornings, Sept. 10th to Oct. 5th; medicine, surgery, and the specialties, Westminster Hospital, for men only, Sept. 16th to 28th. An all-day course in gastro-enterology will be held at the Prince of Wales's Hospital, Tottenham, from Sept. 30th to Oct. 4th. The Metropolitan Hospital will hold its first course under the auspices of the Fellowship, in medicine, surgery, and the specialties, from Oct. 21st to Nov. 2nd. This will be an all-day course. The Fellowship proposes to hold another evening course for the M.R.C.P. examination, from Oct. 15th to Dec. 6th, consisting of 16 lectures on Tuesdays and Fridays at 8.30 P.M., at 11, Chandos-street, W. 1. Full particulars of the above and other courses may be had from the Secretary of the Fellowship at 1, Wimpole-street, London, W. 1.

WELFARE OF MERCHANT SEAMEN.—The second international conference on the health and welfare of merchant seamen will be held at Geneva from Oct. 7th to 9th. Particulars are obtainable from Dr. F. Humbert, League of Red Cross Societies, 2, Avenue Velasquez, Paris.

GIFTS OF RADIUM TO HOSPITALS.—It is stated that a visitor to Westminster Hospital on August 7th left £5000 for the purchase of radium. He did not give his name.—Another anonymous donor has presented £1500 worth of radium to the King Edward VII. Hospital at Windsor, where a department for radium therapy will shortly be opened.

MEDICAL RESEARCH COUNCIL.—Under the auspices of the Council H.M. Stationery Office is about to publish a "System of Bacteriology in Relation to Medicine" in nine volumes, each of some 400 pages. The aim of this system, it is stated, is "to give a comprehensive but not encyclopædic survey of our present knowledge of bacteria and spirochætes, with special regard to their relations to the various fields of medical work." It is being prepared by nearly 100 British bacteriologists, each of whom will treat of subjects in which he has taken special interest; each article will represent the judgment of its author upon the present state of knowledge, based upon the published work of others and his own experience. Volume III. is the first volume to appear and will be available within a day or two.

PEMBROKESHIRE WAR MEMORIAL HOSPITAL.— A new Children's Ward has been opened by Mrs. Lort-Phillips in memory of her husband, the late Colonel J. F. Lort-Phillips, of Laurenny. The opening ceremony was presided over by Lord Kylsant, Lord Lieutenant of Haverfordwest, which enjoys the privilege of being the only borough possessing a Lord Lieutenant.

APPROACHING REMOVAL OF BETHLEM HOSPITAL.— Sir Lionel Faudel-Phillips, the treasurer, in his annual report to the Governors, states that it is hoped to transfer the hospital from Lambeth to the new buildings at Monks Orchard in the course of next year. The Building Fund stands at £47,763, and another £25,000 is needed to start free of debt. During the past year 437 patients were treated, at an average cost of £4 13s. 3d. per head per week. Of the £48,957 thus expended, £14,111 was recovered by payments in respect of patients.

ROYAL SUSSEX COUNTY HOSPITAL.—The late Mr. Bernhard Baron made several large gifts to this hospital including £10,000 for the casualty ward opened in April. While that work was in progress he announced his intention of giving £5000 towards the provision of a new operating theatre. In 1928 no fewer than 2200 operations had to be performed in the space originally deemed sufficient for 800, but the governors decided that all they could do was to improve the existing theatres on the roof of the hospital. Thanks to Mr. Baron's donation, however, these plans have been changed, and on August 6th sanction was given to the erection of a new operating theatre block.

PRESTON INFIRMARY.—Princess Mary on August 8th opened a new wing and unveiled a memorial stone at the Preston and County of Lancaster Queen Victoria Infirmary. The building cost £40,000 to erect and equip, and consists of a complete hospital unit of three large wards—one for men, one for women, and one for children—with an operating theatre and other accessories and an entirely new accident ward. Provision has also been made for 18 private patients who, while wishing to pay part of the cost of their treatment and maintenance, are unable to afford comparatively high fees in a nursing home. With the beds in the new wards and those in the older part of the building, and the beds in the two convalescent hospitals, there is now accommodation for 400 patients.

THE LANCET: SUBSCRIPTION RATES.

INLAND	One Year	£2 2 0
	Six Months	1 1 0
	Three Months	0 10 6
ABROAD	One Year	2 10 0
	Six Months	1 5 0
	Three Months	0 12 6

For complete scale of advertisement charges apply to THE MANAGER.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY, August 19th, to SATURDAY, August 24th.—ALL SAINTS' HOSPITAL, Vauxhall Bridge-road, S.W. Special Course in Urology. Afternoons and evenings (last week).—QUEEN'S HOSPITAL FOR CHILDREN, Hackney-road, Bethnal Green, E. Special Course of Instructions consisting of demonstrations, lectures, and operations. Further particulars from the Fellowship of Medicine.

Appointments.

AITKEN, A. G., M.B., Ch.B. Glasg., has been appointed Certifying Surgeon under the Factory and Workshop Acts for the Callington District of the County of Cornwall.

MCLAGGAN, J. D., F.R.C.S. Eng., Consulting Laryngologist to the Metropolitan Asylums Board Sanatoria.

Vacancies.

For further information refer to the advertisement columns.

Barrow-in-Furness, North Lonsdale Hospital.—H.S. £150.
Birkenhead General Hospital.—Cas. S. £100.
Birmingham City Education Committee.—Asst. School M.O. £600.
Birmingham General Hospital.—Res. H.P. £70.
Bolingbroke Hospital, Wandsworth Common, S.W.—H.S. At rate of £120.
Bournemouth, Royal Victoria and West Hants Hospital.—Second H.S. At rate of £120.
Bradford, Municipal General Hospital, St. Luke's.—H.P.'s and H.S.'s. Each at rate of £200.
Brighton, New Sussex Hospital for Women and Children, Windlesham-road.—Hon. Asst. Ophth. S. Also Hon. Anæsthetist.
Burton-on-Trent, General Infirmary.—2nd Res. H.S. £150.
Cardiff City Mental Hospital, Whitchurch.—Res. Clin. Asst. 50 gns.
Cardiff, King Edward VII. Welsh National Memorial Assoc.—Asst. Res. M.O. for Cefn Mably Hospital, nr. Newport. Also 3rd Asst. Res. M.O. for North Wales Sanat., Llangwyfan. Each £250.
Cheadle, Cheshire, Cheadle Royal.—Asst. M.O. £350.
Coventry and Warwickshire Hospital.—Hon. Anæsthetist.
Dundee, Royal Infirmary.—Hon. Asst. P. for Dis. of Children.
East London Hospital for Children, &c., Shadwell, E.—Res. H.S. and H.P. Each at rate of £125.
Exeter, Royal Devon and Exeter Hospital.—Asst. H.S. At rate of £100.
Great Yarmouth General Hospital.—Sen. H.S. £150.
Hull Royal Infirmary.—Second H.S. At rate of £150. Also Cas. H.S. At rate of £130.
Ilford Emergency Hospital.—Hon. Aural Surgeon.
Kingston-upon-Hull, City and County of.—M.O.H. £1500.
Leicestershire Royal Infirmary.—H.S.'s, H.P., &c. Each at rate of £125.
Lincoln, Bracebridge Mental Hospital.—3rd Asst. M.O. £350.
Liphook, Hants, King George's Sanatorium for Sailors.—Asst. M.O. At rate of £200.
Liverpool, Walton Institution, Rice-lane.—Res. Asst. M.O. £200.
London Jewish Hospital, Stepney Green, E.—Cas. O. At rate of £150.
London Temperance Hospital, Hampstead-road, N.W.—Cas. O. At rate of £120.
Longton Hospital, Staffs.—H.S. £120.
Lowestoft and North Suffolk Hospital.—H.S. £150.
Manchester and District Radium Institution.—Asst. Radiologist. £350.
Manchester, Royal Infirmary.—Clin. Asst. £35 for six months.
Mexborough, Montagu Hospital.—Radiologist.
Mile End Hospital, Bancroft-road, Mile End, E.—Res. Asst. M.O. £450.
Milford, Surrey County Sanatorium.—2nd Asst. M.O. £400.
Newcastle-upon-Tyne, Hospital for Sick Children.—Res. Sen. H.S. and Res. H.P. Each at rate of £95. Also Jun. H.S. At rate of £100.
National Hospital for Diseases of Heart, Westmorland-street, W.—M.O. to Out-patients. At rate of £125.
Nottingham General Hospital.—H.P. Also Asst. Res. Cas. O. Each at rate of £150.
Oswestry, Shropshire Orthopædic Hospital and Agnes Hunt Surgical Home.—H.S. £200.
Portsmouth Royal Hospital.—Cas. O. At rate of £100.
Plumstead and District Hospital, Plumstead High-street, S.E.—Third Asst. M.O. £300.
Plymouth, South Devon and East Cornwall Hospital.—H.P. At rate of £120.
Rotherham Hospital.—H.P. £180.
Royal Eye Hospital, St. George's-circus, S.E.—12 Salaried Refractionists. 12 Clinical Assts. Also 1 Pathologist.
Royal Northern Hospital, Islington Tuberculosis Dispensary, Holloway, N.—Tuberculosis Officer. £750.
Royal Waterloo Hospital for Children, &c., Waterloo-road, S.E.—Clin. Assts.
St. Helen's Hospital, Lancashire.—Res. M.O. £250.
Sheffield, Jessop Hospital for Women.—Sen. Res. O. £250.
Sheffield Royal Infirmary.—Jun. Aural and Ophth. H.S. £80.
Southampton, Royal South Hants and Southampton Hospital.—Jun. H.S. Also Cas. O. At rate of £130 and £120 respectively.
Swindon and North Wilts Victoria Hospital.—Hon. Aural Surg.
Tipton Urban District Council.—M.O.H., &c. £800.
Warrington Infirmary and Dispensary.—Hon. Dental Surgeon.
Warwickshire, King Edward VII. Memorial Sanatorium.—Sen. H.P. and Jun. H.P. At rate of £275 and £200 respectively.
Watford, Herts Peace Memorial Hospital.—Res. M.O. At rate of £150.
West Bromwich and District General Hospital.—H.S., H.P., and Cas. H.S. Each at rate of £200.
West London Hospital, Hammersmith-road, W.—Res. Asst. S. £200. H.P., H.S.'s, &c. Each £100. Also Non-Res. H.S. £5 5*s.* weekly.
Weston-super-Mare General Hospital.—H.S. £130.
Winchester, Royal Hampshire County Hospital.—Res. H.S. £150.

Births, Marriages, and Deaths.

BIRTHS.

BARLEE.—On August 11th, at Hull, the wife of R. J. Barlee, Surg. Lieut.-Comdr., R.N. (retired), of a daughter.

BOURDILLON.—On August 9th, at Stow House, Goring-on-Thames to Sylvia, the wife of L. G. Bourdillon, D.S.O., M.B.—a son.

EVERETT.—On August 5th, at a nursing home, the wife of F. A. Everett, L.D.S., Clapham-road, S.W., of a son.

KEEFE.—On August 3rd, to Dorothy, the wife of Dr. D. E. Keefe, 62, Grafton-road N., Plaistow, E.13—a daughter.

NEWELL.—On August 9th, at Clothorn-road, Didsbury, Manchester, the wife of R. L. Newell, F.R.C.S., of a son.

NUNAN.—On August 8th, at Woodcote Lodge, West Horsley, Surrey, the wife of Patrick Francis Nunan, Kenya Medical Service, of a daughter.

QUENNELL.—On August 8th, at Millfield, near Brentwood, Essex, the wife of W. E. H. Quennell, M.R.C.S., of a daughter.

ROWELL.—On August 7th, at Chapel-street, Belgrave-square, S.W., the wife of G. L. F. Rowell, F.R.C.S., L.R.C.P., of a son (stillborn).

MARRIAGES.

BEARE—HESKETT.—On July 31st, at St. John's Church, Plumpton, Cumberland, Cyril E. Beare, M.B., F.R.C.S., of Dorking, to Annie (Pat) Heskett, of Plumpton Hall, Penrith.

LEYS—TEMPLE.—On August 6th, in London, Duncan Gerard Leys, M.B.Oxf., M.R.C.P.Lond., to Erica Hope, only daughter of Mr. and Mrs. Edwin Temple, Carlton-terrace, Glasgow.

DEATHS.

BUCKLEY.—On August 8th, at Clopton Manor, Kettering, Northants, Thomas William Buckley, M.D., J.P. (late Major, R.A.M.C.), in his 71st year.

CROFT.—On August 7th, at Headingley, Leeds, Edward Octavius Croft, M.D., of 33, Park-square, Leeds.

HOAR.—On August 3rd, at Hollingbury-place, Brighton, Sussex, C. de S. Hoar, L.R.C.P. Lond., M.R.C.S. Eng., aged 69.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

WORLD FEDERATION OF EDUCATIONAL ASSOCIATIONS.

(FROM A CORRESPONDENT.)

THIS Federation was first projected by the present President, Dr. Augustus Thomas, Education Commissioner for the State of Maine. It is quite in the International spirit of the time. Its organisation is broadly based among the nations, and probably education is the one concept whose urgency no nation will dispute. It is certain that the nations, both of the East and of the West, have responded to the idea. The meeting just held in Geneva is the fourth; the first was at San Francisco in 1923; the second at Edinburgh in 1925; the third at Toronto in 1927. There is a desire that consecutive meetings should take place in different continents, but where the next meeting will be has not been formally announced.

The Health Section.

The Geneva meeting was a success, as was right in the home of all "internationalisms," as well as of the League of Nations. The Federation has been for ten days the focal centre for several other conferences and discussions, none of them far from its own central idea, which is to provide a non-party platform for all forms of educational theory, practice, and propaganda. But, from the beginning, the Federation established a Health Section, whose proceedings were of practical value at Edinburgh, Toronto, and again at Geneva, for the work of the Section has served to elicit facts and programmes from over thirty nations, including China, Japan, India, Russia, Poland, Latvia, Esthonia, Greece, Roumania, and several others. Western Europe, as well as Canada and the United States, were well represented. The National Teachers' Union of England and the Educational Institute of Scotland both sent large contingents. Naturally, as the Congress was fundamentally educational, the reports presented and discussed at the Health Section dealt with the health of the school ages, and the various methods attempted and proposed for education in health. But in several of the other sections, notably in the section of Rural Education and Agriculture, and the section of School and Parent, health always emerged, and was universally regarded as a necessary condition of all sound school organisation.

In the Health Section it had been arranged that delegates from leading countries should send in advance copies of books, pamphlets, primary official documents of investigations, of administration, of actual and proposed schemes. These many volumes formed a useful reference library; it was well consulted by the representatives of the younger nations, thus showing the true use of these international discussions. The conference was thus able both to learn from the various delegates how far their countries had got in school health administration, to note their readiness to seize on the views of experience, and to reflect on the numerous questionings. Such conversations, set going by the Congress, will promote the intellectual inter-penetration that forms one condition of a safe internationalism. Dr. Alfred Zimmern, of the League of Nations, head of the Geneva School for Intellectual Co-operation, and the author of "The Greek Commonwealth," which is a vital exposition of political ideas and idealisms, made exactly this point in a plenary address, and the Health Section certainly worked in this spirit.

The Chairman's Questionaire.

Prof. C. E. Turner, of the Massachusetts Institute of Technology, Cambridge, was Chairman of the Health Section, which henceforth will cease to be called the "Health Education Section." He had issued early in the year an elaborate questionaire, and the replies formed a very useful way of obtaining precise information from the various countries and of concentrating the discussions. The broad results were formulated in 16 resolutions. Of the 16, the following were the most important: That health one of the first aims of education; that there is need for further training of teachers in methods of health education; that travelling instructors have been found useful to this end; that large-type text-books are desirable; that physiology and hygiene should form part of the instruction in the public schools of every country; that school medical and nursing service should be provided for schools throughout the world, and school-house sanitation (especially hand-washing facilities) should be improved; that there is need for permanent representation of the Health Section in each country, in order that information and documents concerning the progress made in school health may be distributed internationally; that there should be further study of the continuity and cessation of growth in school-children, as an indication of health status; that there is need for greater continuity in the health records of children between the pre-school and the school period; that the teaching of home hygiene, infant and child care should be made universal for girls of adolescent age; that there is need for the study and development of further tests, in addition to weighing and measuring, for determining the health status of school-children; that further study of dental health is necessary; that every university should provide a student, in addition to athletic organisation and health instruction, with a health service, including preventive medical service, communicable disease control, financial aid in sickness, hospital treatment where necessary, and convalescent care.

Some Outstanding Contributions.

Of individual contributions to the Congress, three stand out clearly; first, the excellent address on the International Aspects of Education, by Prof. Gilbert Murray, whose position in relation to the League of Nations and the detailed work of its committees is well known; second, the practical and elegant address by Prof. Léon Bernard, Head of the Institute of Hygiene in the Paris School of Medicine: on the teaching of hygiene in, by, and through the school, stress being laid on "teaching by example"; third, the lecture at the final meeting by Prof. Paul Monroe, LL.D., now Professor of Education in Columbia University, who drew attention in a masterly way to the great educational experiments made, or being made, in China, Japan, the Philippines, and Russia. To many of the audience who had heard dissertations of all sorts on education for a generation this lecture was one of the most striking, forming an effective climax to a week of strenuous work.

A fourth contribution deserving of mention was the address by Dr. Thomas D. Wood, of New York, who spoke as chairman of the united session of the Home and School and the Health sections; this was the mature deliverance of the veteran author of the well-known height and weight standards, which are widely used as tests of school-age, growth, and nutrition.

The Wide Range of Work.

There were some good contributions to the study of physical education which is now taking its place as a definite method of preventive medicine, and which may become primarily a responsibility upon school medical officers. Communications from Hungary and Poland were exactly illustrative of this point.

From both Belgium, through Monsieur de Vuyst of the Belgian Education Department, and France, through Monsieur Varrier of the French Department of Public Instruction, came a survey of the factors in the problems arising out of the different conditions, as far as education is concerned, which prevail in the town and in the country. Such problems, and many others like it, were discussed especially by American representatives and by American members of the International Parents' Association, for in America the educational position arising from immigration, with the extraordinary mixture of cultures and races resulting, requires perpetual and great adjustment.

When the transactions of the Congress are published they will be found to contain illuminating surveys from which educational authorities in many countries will be able to derive practical information and guidance.

Geneva, August 7th, 1929.

FOCAL SEPSIS IN DISEASES OF THE SKIN.

THE doctrine of focal infection, which has hitherto found its chief supporters in England and America, is now gaining adherents on the continent, and A. M. Memmesheimer, a well-known dermatologist of the younger school in Germany, has published a paper[1] in which he seeks to establish a scientific foundation for the now popular hypothesis.

Considering that the claims put forward by such authors as Roberts, Barber, Niord, Semon, and others are based on clinical evidence only, and on material too scanty for satisfactory proof of the alleged association of cause and effect, he set himself to investigate the doctrine in the case of 66 patients, of whom half were sufferers from chronic eczema, and the other half included 14 cases of psoriasis, four of lupus erythematosus, seven of herpes zoster, two of rosacea, and one each of erythema nodosum and erythema multiforme. These were utilised as controls. Of the 33 eczematous cases, 26 were found to have apical "granulomata" as clearly demonstrated by X rays. Six of the 14 psoriasis patients, one of the four with lupus erythematosus, and four of the seven with herpes zoster, afforded similar evidence of apical

[1] Arch. f. Derm. u. Syph., 1928, clvii., 183.

infection. The proportion of dental infections in the two groups worked out at 79 per cent. to 51 per cent.

Memmesheimer here raises the important question whether we should regard the preponderating percentage of dental infections in the eczematous group as evidence of a causal factor, or whether people with the cutaneous idiosyncrasy may not have an associated weakness or lack of resistance in their dental tissues. It might further be argued that dental toxins can sensitise the body to some other exogenous or endogenous poison which would not be capable of producing cutaneous symptoms in their absence. In the hope of showing some of these problems, he examined the elective or specific action of the streptococci from dental foci, and endeavoured to elicit some evidence of their presence, or that of their toxins, in the patient's own blood and tissues. Injections into rabbits and mice were tried, both with single large doses and small repeated doses, designed to imitate toxic absorption in human beings. Mice were found to be relatively immune, but of 27 rabbits inoculated with the massive single dose 15 died, and in 9 of them the streptococci were recovered in cultures from the blood. In no single instance were skin lesions produced, nor did such lesions make their appearance in a similar series (27) injected from day to day.

Complement-fixation tests, both of the blood serum and tissue cells, in 14 patients tested to their own strain of streptococci and to foreign strains, were positive in two cases, and that in a restricted sense only. But removal of the infective foci—i.e., the apical granulomata— cleared up the eczema in 5 out of 15 cases, and Memmesheimer holds that the low percentage of positive findings is by no means conclusive evidence against the doctrine of focal sepsis. Further research on the same lines is, he thinks, desirable.

HEALTH CONDITIONS IN THE FALKLAND ISLANDS.

A REPORT prepared by Mr. J. M. Ellis, Colonial Secretary, has recently been issued by H.M. Stationery Office, dealing with the affairs of the Crown Colony of the Falkland Islands and its Dependencies. Geographically the Falkland Islands lie in the South Atlantic Ocean. In addition to the two main islands, known as the East and the West Falkland, the group comprises about 200 small islands clustered around them, within a space of 120 by 60 miles. The Dependencies are divided into two main groups, the one consisting of South Georgia with the South Orkneys and the South Sandwich Islands, and the other of the South Shetlands with Graham's Land. The area of these Dependencies covers 3,100,000 square miles, or approximately one-fifth of the total area of the British Empire. The population of the colony, which at the end of 1927 was 2286, is European, and chiefly of British descent. The birth-rate during that year was 22·31 per 1000, and death-rate 9·26 per 1000. As in previous years, general diseases were rare, with the exception of tuberculosis, which is common. Its prevalence seems to be aggravated by close inter-marriage and by inadequate housing conditions. Steps are being taken to improve the latter; and it is hoped in the near future to organise a scheme to examine sputums, in the hope of discovering the disease at earlier stages. Chronic appendicitis is also prevalent among the inhabitants of the colony. Communicable diseases, mosquito or insect borne, were entirely absent, and no acute infectious condition was reported during the year. Septic throat and cervical adenitis were troublesome.

Particular care is being devoted to the dental treatment of the school-children, who all receive free attendance. An outbreak of bad colds occurred some time ago, and treatment with stock vaccine did not meet with much success. The colony is devoted solely to sheep farming, and all its interests are subordinate to the production of wool.

The Falkland Islands are bleak and the climate is rigorous but healthy. It is trying to people from the United Kingdom on account of the continuous cold, the lack of sun, and the constant high winds, and also because few opportunities are afforded for outdoor exercise.

INTENSIFYING SCREENS.

WE have received a booklet from Philips Lamps Ltd., entitled Intensifying and Fluorescent Screens, which is devoted mainly to a description of intensifying screens manufactured by this firm. The Philips screen is coated on a celluloid base which, it is claimed, is not easily scratched or damaged, and moreover may be washed with water, petrol, or methylated spirit. From a perusal of the pamphlet it is clear that the manufacturer is alive to those qualities which a fluorescent screen must possess if it is to be efficient.

The use of an intensifying screen for reducing the exposure required to produce a radiogram dates back to 1897. Experience has shown that the yellow green fluorescence emitted by irradiated barium-platino cyanide, though admirable for fluorescent screens, is relatively ineffective on a photographic emulsion, which, unless specially prepared, is only particularly sensitive to violet and ultra-violet radiations. Fluorescence of this character is excited in calcium tungstate by X rays which in consequence forms the active layer of modern intensifying screens. The production of calcium tungstate of high photographic activity free from phosphorescence and in a fine state of subdivision, has, however, necessitated a considerable amount of experimental work. The fine detail of many of the earlier radiograms was confused by the impression of the crystalline structure of the screen, and the afterglow from the latter often destroyed the sharpness of the image; but it may be fairly claimed that the modern intensifying screen is free from these defects.

It is common practice to place intensifying screens on both sides of a film, which leads to a considerable reduction in the time necessary to produce a radiogram. From the photographic point of view there is, moreover, the added advantage that the value of the screen is greatest in the lower densities where it is most required, and hence for instantaneous radiography they are invaluable.

Much of the success obtained with intensifying screens depends not only upon the mechanical qualities of the materials used as the foundation for the fluorescent layer, but also on the casette for holding it close to the photographic film. Experience has shown that both must be such that the screen is held in perfect contact with the film at all points during exposure, otherwise blurring of the image may occur and the screen becomes inefficient. How far improvements in these directions have been made may best be judged by the fact that the intensifying screen is now regarded as an essential part of modern radiographic equipment.

VESALIUS AND THE INQUISITION MYTH.

To the Editor of THE LANCET.

SIR,—Some stories seem to be endowed with immortality It is of no consequence that they have no basis in fact; it is enough that they are tinged with some colour of romance, or that their tragic dénouement excites pity, or that they can be used to make a point in controversy. Truth limps painfully behind and never makes up to them. A recent illustration of this is to be found in Prof. A. V. Hill's lecture on the Enemies of Knowledge. As it is reported in your columns (June 29th, 1929, p. 1389), he spoke as follows: "Vesalius was inspecting *with* the consent of his kinsman the body of a Spanish nobleman recently dead; the heart gave a feeble palpitation when divided by the knife. Vesalius was denounced to the Inquisition and driven from Italy." No doubt Prof. Hill believed he was merely stating facts, and yet there is not a single phrase in this description which will bear examination. It is over 30 years since I first published the proof of its falsity, and I went into the matter with greater detail in the *Edinburgh Medical Journal* in 1914. More recently a short summary of the genesis of the myth appeared in THE LANCET (Jan. 11th, 1928, p. 105). The statements I have made have not been controverted. Indeed I do not know any authority on Vesalius who credits the story. All I can claim to have done is to have examined most closely all the contemporary documents relating to that period of the anatomist's life. If, then, Prof. Hill has discovered fresh documentary evidence, he would confer a boon on students of medical history by publishing it.

I am, Sir, yours faithfully,

Edinburgh, August 12th, 1929. G. MATHESON CULLEN.

NITRATE POISONING: AN EPITAPH.

WE are informed that the following appears on a tomb at Cross Kirk in Eshaness, Shetland.

Donald Robertson, born Jan., 1783, died June 4th, 1848, aged 65. He was a peaceable quiet man, and to all appearance a sincere Christian and his death was very much regretted and was caused by the stupidity of Lawrence Tulloch in Closeheston (?) who sold him nitre instead of Epsom salts, by which he was killed in the space of five hours after taking a dose of it.

ENLARGEMENT OF HARROW HOSPITAL.—The district served by Harrow Hospital is increasing so rapidly in population that it has become urgently necessary to enlarge the institution. An extension to cost £22,500 has been prepared as part of a larger scheme which it is hoped eventually to carry out. There are at present 40 beds, but the enlargement will comprise wards for 18 additional beds and for 12 paying patients, an X ray department, a new operating block, and quarters for a resident medical officer. Nurses' quarters will be erected in the garden of the hospital. The extension is to be known as "The Stuart Memorial," in honour of the former president, the late Mr. J. N. Stuart.

Lettsomian Lectures

ON THE

RELATIONSHIP OF DERMATOLOGY TO OTHER BRANCHES OF MEDICINE.

Delivered before the Medical Society of London

BY H. W. BARBER, M.B. CAMB., F.R.C.P. LOND.,
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LECTURE I.

I HOPE to show in these lectures that Erasmus Wilson [1] was justified in his statement that "cutaneous medicine is a branch of general medicine of no insignificant importance," and for my part I hold very strongly the opinion that a study of the *normal* skin and accessible mucous membranes, and of the commoner changes that occur in them as a result of faulty metabolism, the action of physical and chemical irritants, and of external or endogenous invasion by infective organisms or toxic substances, should serve as the student's introduction to clinical medicine. For it is but logical that he should first be taught to see and interpret what he sees, and it is in imparting this faculty of observation and deduction that the dermatologist should find his chief métier in the early stages of a student's training.

PHYSIOLOGICAL FUNCTIONS OF THE SKIN.

It is the merest truism to say that the skin is the buffer between the body as a whole and its environment, and I will not waste time by enumerating its commonly accepted functions. There are, however, certain points in its physiology which are insufficiently realised, but are of profound importance in general medicine. As Ormsby [2] says: "The skin, in view of the number and mode of distribution of its nervous elements, may be regarded as a vast area of sensitive nerve-terminals." In virtue of this it determines to a great extent the reaction of the various organs of the body to external influences—heat, cold, light, and trauma. This it does owing to its close physiological connexion with the vegetative nervous system and the endocrine glands. It is not too much to say that it is through the medium of his skin that the evolution of civilised man has occurred, and for the following reasons.

The differentiation of the various species of animals and of the different types of mankind is in some degree a question of climatic conditions. As Cramer [3] points out, Man, in view of his comparative hairlessness, which handicaps his prevention of heat-loss, could only have originated in a tropical climate. But the constant damp heat of the torrid zone affords no stimulus to the endocrine-autonomic system, on the activity of which the maximal development of psychical and physical energy depends. Presumably civilisation dates from the time when a band of primitive men wandered northwards from the tropical zone, and, with the approach of winter, under the unfamiliar stimulus of cold to their naked skins, contrived to obtain artificial warmth, first, no doubt, by digging underground shelters, constructing huts, using the skins of animals as clothing, and later by discovering how to make fire. The action of cold on the skin was doubtless a most potent stimulus to Man's inventive faculties, and the means of protection that he gradually discovered made him more or less independent of climatic conditions. Having become so, however, his further development, the differentiation of races, and their subsequent rise or fall have depended on several factors, of which climate, with its local variations through the ages, has been, perhaps, the most important.

Ellsworth Huntington,[4] in his absorbing book "Climate and Civilisation," deals fully with this question. He illustrates in convincing fashion not only the broad effect of climate upon physical and mental activity, and consequently upon national characteristics, but also the influence of the weather at a given time on the degree of efficiency in work and on health. It would appear that "the same conditions of temperature, humidity, and variability which cause people to work quickly or slowly in the ordinary affairs of life seem also to cause their health to be good or poor."

I cannot here even briefly summarise Huntington's data or discuss his conclusions; for our purpose it is enough to emphasise the following points:—

(1) For work and health the best climate is one in which the mean temperature rarely falls below 38° F. or rises above 64°—i.e., an average of about 51° for the whole year.

(2) Apart from the mean temperature, variability of temperature and weather conditions from day to day are factors of great importance, as also is the relative humidity. Moderate changes of temperature are more stimulating than uniformity, a fall being preferable to a rise as regards human efficiency; a mean temperature of from 50° to 60° is the optimum for both physical and mental activities, which diminish rapidly above 65°.

(3) Localities, in which these conditions favourable to efficiency obtain, are exactly those in which human progress has reached its maximum, as may be seen at a glance in the maps, illustrating the distribution of civilisation, health, and energy, in Huntington's book.

Let those of us who are inclined to rail against our climate remember that it is largely responsible for the position in the world held by the Anglo-Saxon race to-day. It may not be the most agreeable, but, as Cramer says, comfort does not make for human progress.

Now it is clear that it is through the medium of the skin that the influence—stimulating or otherwise—of climatic conditions is exerted, and the significance and explanation of this influence upon human efficiency and health is afforded by Cramer's work on the thyroid-adrenal apparatus. Our sense of well-being, our initiative, and our resistance to many bacterial infections are dependent largely on our vegetative nervous system, which in turn is activated and regulated by endocrine glands, particularly the thyroid and adrenals.

Cramer has shown that heat-regulation is a function of this thyroid-adrenal-sympathetic system. The normal stimulus to this system is *the action of cold on the skin*, particularly the change from a warm to a cold environment. Under this stimulus the adrenals and the thyroid undergo striking histological changes indicative of intense activity; their capillaries dilate and into them are poured the active secretions—adrenalin and thyroxin respectively—which stimulate the sympathetic throughout the body. As a result the cutaneous vessels are constricted to diminish heat-loss, and this constriction, if intense enough, inhibits sweat secretion; the voluntary muscles, the chemical activity of which, according to Orbeli,[5] is under the control of the sympathetic, are stimulated, voluntary muscular exercise or involuntary movement—i.e., shivering—being the response to such stimulation; and the liver secretes more glucose into the blood stream, in order to provide the muscles with more fuel, the consumption of which increases heat-production, thus creating a rise in the metabolic rate.

On the other hand, in an animal or person at rest, in a warm even atmosphere, the alveoli of the thyroid remain full of colloid, many of the capillaries surrounding them, which are dilated when the gland is actively secreting, are invisible, and the cells of the adrenal medulla are fully charged with adrenalin. Metabolism is quiescent, the demand of the tissues for glucose is minimal, and excess of food is deposited as fat. Long-continued exposure to cold will, of course, in time lead to exhaustion of the adrenals and thyroid, and deplete the liver of glycogen; heat-regulation, therefore, fails, there is great heat-loss without a compensatory heat-production, and death results.

It is thus easy to understand the virtue of a temperate climate, with its frequent but moderate changes from warmth to cold and vice versa, since such changes tend to keep the thyroid-adrenal-sympathetic apparatus in a state of maximal efficiency,

making for vigour of body and mind; on the other hand, the relaxing effect of the constant moist heat of the tropics, which induces physical and mental indolence, and the paralysing influence of long periods of intense cold are likewise explicable.

Here the personal factor comes into consideration. In the struggle for supremacy between the races, both in warfare and in industrial competition, the weakling is of no account, and is merely a drain on his country's resources; it is a question of the *average* standard of physique, mentality, and initiative. We, as doctors, however, have to consider the weakling, and we are all too familiar with the type for whom our climate is the reverse of stimulating. There are many whose endocrine-sympathetic system is unable adequately to respond to the stimulus of cold, and are only happy in warm surroundings. One such type is provided by the thin, hypotonic, ichthyotic person, in whom asthma and its associated symptoms are so common, and who spends his winter shivering and snuffling over the fire. It has long been recognised that these persons present symptoms indicative of thyroid-adrenal insufficiency. Another type which cannot adapt itself to cold weather is represented by the acro-asphyxial girl, who, since the vogue of short skirts, has crowded our out-patient departments in winter on account of a passive erythema, often accompanied by actual œdema and chilblains, involving the lower parts of the legs and ankles. This condition—christened "erythrocyanosis crurum puellaris"—has received a good deal of attention of late, both in this country and abroad. That it depends on a lack of tone of the capillaries in the skin would seem certain, and the general appearance of those in whom it occurs suggests an endocrine insufficiency. In view of its incidence almost exclusively in females, and the frequency of amenorrhœa or menstrual irregularity, one would suspect a disorder of normal ovarian, and perhaps thyroid and pituitary function. These two types, at any rate, if compelled to live a sedentary life, are ill-adapted to a cold or even temperate climate; they both feel and work better in moderately warm countries with abundance of sunlight.

Although, however, the invention of clothing and artificial methods of heat-production have enabled Man to flourish in climates which favour his activities and progress, leading thus to the evolution of our present complex civilisation, yet, owing to the misuse of the very comforts, pleasures, and labour-saving devices that his own ingenuity has created, and to the unnatural conditions under which a large proportion of a civilised population lives, the effect on his purely animal functions has been disastrous. On the one hand we have the self-indulgence in excess of food and drink, and the slothful physical ease, engendered by wealth, which result in the metabolic diseases of plethora, so common among the richer classes; on the other, the diseases of under-nutrition, faulty diet, insufficient sunlight and vitiated air, predisposing to serious infections, such as tuberculosis and rheumatism, that ravage the poor.

A wise Frenchman has said: "L'homme ne meurt pas, il se tue"; he has created his own pathology, and it is a sobering reflection for us, as medical men, that we spend our lives trying to cope with morbid conditions that are for the most part of Man's own making. The study of metabolic functions gone wrong, or of the multitude of infections engendered by civilisation, and the elaborate methods of treatment by drugs, vaccines, sera, and so forth, though of absorbing interest, must nevertheless to the abstract philosopher, appear pathetically humorous.

To anyone who surveys the general trend of medical research and treatment during the past few years it must be obvious that we are getting back to where we started from. While admitting that Man's progress is partly dependent on his control of temperature by clothing and fuel, when he begins to pay the penalty we strip him and expose his naked skin to the sun and air, its natural medium, or, less successfully, to artificial sunlight, or we stimulate its natural functions by hydrotherapy; and, while voting for politicians who solemnly budget for cheap foods of a kind that are precisely the least valuable, or actually harmful, and while admiring the ingenuity of the Chicago meat-packer or the tinned-fruit exporter, we advise our patients to avoid their goods, and eat chiefly the fresh produce of the vegetable garden, orchard, and dairy farm. Although the ancient Egyptians, Greeks, and Romans were all apparently cognisant of the beneficial action of sunlight and cool air on the skin, and of physical exercises, modern civilised peoples have only recently rediscovered this, together with the essential qualities of certain natural foods. The very factors which enabled man to emerge from his tropical lassitude have for generations militated against his physical development and health. Clothing and fuel, which are essential for him if he is to withstand the rigours of winter, he has abused, covering his unfortunate skin, even in summer, with layer after layer of thick impermeable material, and heating his houses, hotels, and public places to such a degree that he creates an atmosphere even more pernicious than that of the torrid zone from which he sprang.

The evil effects of overheated rooms, both on physical energy and on resistance to microbial infection, have been amply demonstrated by the experiments of the New York State Ventilation Commission (quoted by Huntington[4]). This Commission found that even slight overheating (75° F.) throws a burden on the heat-regulating system of the body, there being a marked *decrease in general vasomotor tone*, with an abnormal reaction of the mucous membrane of the nose, leading ultimately to chronic atrophic rhinitis, and, when followed by chill, producing a moist and distended condition of the membranes, calculated to favour bacterial invasion. In animals, exposure to high atmospheric temperatures, particularly when followed by chill, diminishes the protective power of the blood and markedly increases general susceptibility to microbic disease. Similarly, with regard to clothing, the arbitrary dictates of modesty and fashion and the mistaken fear of "catching cold" have robbed the body of one of its chief metabolic regulating mechanisms, and most important defences against infection—namely, the exposure of the skin to light and air.

I have said that civilised man has created his own pathology, but this statement requires some amplification. One can, I think, reasonably compare the diseases to which Man, living an active outdoor life under so-called primitive conditions, is subject, to those of animals in their natural wild state; and similarly those of Man under so-called civilised conditions with those of animals in captivity. In the former case both Man and wild animals are liable to invasion by parasites, conveyed, for example, by biting insects, or in water or food; in the latter case, however, the unnatural conditions have created certain disorders of metabolism and function, which were probably unknown amongst primitive peoples and do not occur in wild animals, and infection with a number of banal and incompletely differentiated organisms that were originally harmless saprophytes but which have become pathogenic, partly owing to the favourable environment afforded by such metabolic and functional disorders, and partly to the facilities for transference and persistence that overcrowding and other factors supply.

Even in the memory of our generation the kaleidoscope of disease, viewed as a whole, has changed, as Horder[6] illustrated very clearly some years ago in his paper on New Diseases for Old. Briefly stated, the more virulent infections are being succeeded by a variety of subacute or chronic conditions due, as I have said, to organisms that were formerly considered non-pathogenic, and normal habitants of our mucous membranes.

Now I wish to illustrate these remarks in the following way. The skin and the mucous membranes of the mouth, nasopharynx, and intestines have a natural *saprophytic* flora of their own; they may al

be invaded and actively infected by organisms foreign to them with the production of well-defined and specific diseases, but their own common saprophytes may under certain conditions become themselves pathogenic, giving rise both to local lesions, and, by invading the blood stream or elaborating absorbable toxins, causing morbid effects in distant organs or tissues.

In a paper I read before the Odontological Section of the Royal Society of Medicine in 1927 [7] I said:—

"It is clear that in dealing with the question of actual infection with these common saprophytic but potentially parasitic bacteria we have to consider, first, their active growth in the host's tissues, and, secondly, the immediate and remote results of such active infection. The first part of the question is clearly biochemical or metabolic in nature; what, in fact, are the changes that take place in the host that render him a suitable culture-medium for organisms which he normally harbours only as saprophytes? The second part of the question is concerned with the local pathological changes produced by bacterial invasion, and with the possible systemic effects that may arise from it in parts of the body remote from the original site of invasion; in other words, focal sepsis and its results."

External Infections of the Skin.

The skin is liable to invasion from without by parasitic organisms varying from insects to filtrable viruses. Now it might be thought that in the genesis of these external infections the influence of internal factors hardly comes into play. Nothing is farther from the truth, yet this view was largely held by one German school of dermatologists, which threw scorn on the terms "diathesis" or "soil" so often employed, particularly by the opposing French school. To cite an oft-quoted example, the common ringworm infection of the child's scalp dies out at puberty, and, except in the rarest instances, is never seen on the adult scalp. Why? Not, I think, owing to the development of a general immunity, for as Adamson [8] points out, the ordinary microsporon of scalp ringworm grows in the horny tissues, and excites, as a rule, little or no inflammatory response; but presumably because some change occurs in the horny layer or possibly the sebum of the scalp at puberty, which is inimical to the growth of the fungus, and such a change must be primarily of internal origin.

When we come to consider the common saprophytes of the skin this influence of internal factors is still more apparent. Contrary to popular belief, normal clean skin is remarkably amicrobial. The intact healthy horny layer, although it may harbour organisms on its surface, is never penetrated; only in the mouths of the pilosebaceous follicles does one see a few cocci, lying as Sabouraud [9] insists, as isolated units and not in a state of active growth. Normal sebum is composed of various neutral fats, mixed with fatty acids, which are in combination, not with the tribasic alcohol glycerol, but with the monatomic alcohol cholesterol. These cholesterol fats are not easily decomposed by bacterial growth, and are not a suitable culture medium. I repeat that in absolutely normal skin there is no active bacterial growth; on the other hand, in the most trivial infective lesions one finds an astonishing number of organisms, and it is fairly safe to say with Sabouraud and Whitfield [10] that "when an organism is found in a state of active growth upon the skin it is exciting its noxious effect if it has any."

When we survey the list of organisms that may infect the skin we can pick out three that are so commonly present that they may be considered as normal habitants, at any rate in civilised man; they are: the pityrosporon of Malassez, the micro-bacillus of acne, and the *Staphylococcus albus*. Nevertheless, the skin of a normal person in perfect health will show no evidence of active infection with these organisms. I make this statement dogmatically, knowing that, since some degree of such infection is so common, it may be disputed; it is a question of the normal standard.

The active growth of the three organisms named above is predisposed to by that morbid state of the skin which is usually termed *seborrhœa*, by which is meant an excessive and altered secretion of the sebaceous glands; but seborrhœa is only one symptom of the complex that has been variously termed "la kérose" by Darier, the "status seborrhœicus" by Montgomery, Semon, and myself, and the "seborrhœic diathesis" by Scholtz. I do not mean to imply that these organisms only grow in seborrhœic skins, but seborrhœa is by far the commonest predisposing factor to such growth.

The term "diathesis" employed by the old clinical physicians to designate a predisposition to certain symptom-complexes, which they clearly recognised but could not explain, almost withered before the storm of more accurate knowledge acquired from a study of post-mortem pathology and bacteriology. Sabouraud, to whom we owe so much of our knowledge of external infections of the skin, has himself made some very scathing comments upon it, but we are now returning to the conception of diathesis, because biochemistry suggests and will doubtless confirm its accuracy. Of all diatheses the seborrhœic one is probably the commonest, and for this reason, perhaps, it has been practically ignored in the past by general physicians, who, obsessed by the symptoms and signs of what is called "organic disease," have neglected the tell-tale surface markings of faulty metabolism. The importance of the seborrhœic state in my present thesis is that it exemplifies how a metabolic change resulting from unnatural conditions of life may produce an environment which enables harmless saprophytes to become parasites and produce "skin diseases"; it enables us to study the local defensive reactions of the skin against these several organisms, the underlying factors which predispose to the change from saprophytism to parasitism, and the means of preventing or counteracting this change. As we shall see, however, the skin is not involved alone in the seborrhœic state; the mucous membranes suffer too, and become likewise a prey to their particular saprophytes.

The Seborrhœic Triad of Organisms.

It is necessary to say a word about the triad of organisms that inhabit the skin, but I shall avoid irrelevant detail.

The Pityrosporon of Malassez.

First discovered by Malassez in 1874 this organism was, so to speak, rediscovered by Unna and named by him "Flaschen-bacillen," and since then has been commonly known as the "bottle-bacillus," an unfortunate name since it is not a bacillus. Sabouraud[11] insisted on its constant presence in a state of active growth in the horny scales of the true pityriasis simplex of Willan—the familiar "scurf" or "dandruff," and he pointed out that it grows exactly in the same way between the superficial layers of the stratum corneum as does the *Microsporon furfur* of pityriasis or tinea versicolor, which, although like the pityrosporon of Malassez, had at that time never been cultivated artificially, was nevertheless universally accepted as the causal organism of this condition.

Sabouraud's arguments that the pityrosporon of Malassez must be the cause of simple dry scurf were accepted by most dermatologists, and until recently it has been generally held that the definitely inflammatory group of eruptions, known variously as seborrhœic dermatitis or eczema, seborrhœides, eczématides (Darier), of which the so-called "flannel rash" of Blackfriars Hospital is, perhaps, the best defined, was due to infection with the pityrosporon of Malassez and a *Staphylococcus albus* (the polymorphic coccus of Cedercreutz), growing in symbiosis. The difficulty of determining this point experimentally was largely due to failure to cultivate the pityrosporon; inoculation of the skin with cultures of the above staphylococcus produced merely small superficial follicular pustules.

Sabouraud attempted to grow the pityrosporon on a number of media without success; Whitfield[12] obtained it once in impure culture, but lost it in attempting subcultures; Templeton,[13] in 1926, announced that he had cultured it anaerobically,

but the growth was poor. As long ago as 1908, however, W. G. Garner succeeded in growing it on maltose agar and acid glycerine agar, but his achievement was neglected, until quite recently MacLeod and Dowling[14] not only determined its cultural reactions, but also performed some very important inoculation experiments with it.

The organism is one of the fungi imperfecti and belongs to the class Oösporaceæ. It is nearly related to monilia, but differs from it in certain respects; for example, the pityrosporon forms no mycelium in solid media, but mycelial threads are abundant in fluid media, whereas the monilia produces scanty thick mycelium on solid but none on fluid media. By inoculation of cultures of the organism MacLeod and Dowling were able to produce typical figurate seborrhœic dermatitis, indistinguishable both in evolution and appearances from the natural eruption. Inoculation on normal non-seborrhœic skins produced a group of follicular papules within 24 hours, which lasted about ten days and then disappeared; in some seborrhœic subjects, particularly those with active seborrhœic dermatitis present, a more acute reaction developed, and a widespread figurate patch sometimes resulted.

It is thus clear that seborrhœic dermatitis, like simple dandruff, is a pure fungus infection due to the pityrosporon; the degree of inflammation produced by the organism appears to depend partly on the site infected, the scalp, though the commonest, being as a rule more resistant than the glabrous skin, and partly on the constitution and habits of the host.

The Acne Bacillus.

First described by Unna and Hodara[15] as the acne bacillus, and later by Sabouraud[16] as the microbacillus of seborrhœa, this organism has been the subject of considerable discussion, particularly as regards its exact rôle in the genesis of simple seborrhœa and of the polymorphic eruption, acne vulgaris. It would be irrelevant to deal with this discussion here, but the following points should be noted: (1) The acne bacillus grows in the infundibulum or upper third of the pilosebaceous follicle—i.e., the part lying between the opening of the sebaceous gland and the mouth of the follicle. In this portion, as Sabouraud[17] emphasises, there is a virtual space between the epithelial lining of the follicle and the hair, occupied by sebum and horny débris. (2) If the so-called "seborrhœic cocoon" be expressed from the pilosebaceous follicle of a seborrhœic person, squeezed flat on a slide, and suitably stained, myriads of acne bacilli will be seen obviously in a state of active growth. (3) As a result of infection of the follicles with this organism there may arise in certain situations the polymorphic lesions of the common acne juvenilis—comedones or "blackheads," acne papules, pustules, &c. Sabouraud, I think rightly, maintains that the true acne pustule is due to the acne bacillus, and not to a secondary invasion with a *Staphylococcus albus*, although staphylococcal lesions may be and often are present in acne. This view has been recently confirmed by Goldsmith's[18] work on the staphylococci in acne vulgaris.

The Staphylococci.

The *Staphylococcus pyogenes aureus* is not a normal habitant of the skin, a fact that is often not appreciated. Both Goldsmith and Ferguson Smith[19] have confirmed this, but once an active infection with this organism occurs, it is, so to speak, "sown" in the mouths of the pilosebaceous follicles, not only in the neighbourhood of the active lesions, but also in parts of the skin widely distant from them, and the patient becomes a "pyococcus-carrier"; the danger of such a carrier in connexion, for example, with epidemics of pemphigus neonatorum, is clearly shown by the recent work of Benians and Jones.[20]

With regard to the *Staphylococcus albus*, it is useless, I think, to attempt to differentiate the various strains that have been described. Cedercreutz[21] considers that all these are but modifications of the same organism, and, as Benians[22] says, "the habits of the *Staphylococcus albus* in its various forms seem to be anything from those of a harmless saprophyte to those of a definitely pyogenic organism. Culturally, it appears to vary from a greyish and translucent to one of a brilliant enamel white colour." Suffice it to say that the *Staphylococcus albus is* a normal habitant of the skin—saprophytic but potentially parasitic, like the pityrosporon and the acne bacillus. The natural position in the skin for staphylococci is the mouth of the pilosebaceous follicle, and for the most part staphylococcal lesions are primarily follicular.

Habitat of these Organisms.

The three organisms that I have just briefly described may be regarded as the normal flora of the human skin, at any rate under civilised conditions. Each has its own localisation or site of election in the skin, and each, as Sabouraud and Adamson have pointed out, when it takes on active growth, excites a special type of cell-response to invasion.

Thus the pityrosporon, like a ringworm fungus—e.g., the *Microsporon furfur*, grows in between the layers of the stratum corneum, which hypertrophies, and is shed in visible flakes or pellicules ("dandruff" or "scurf"), such exfoliation, no doubt, being an attempt to cast off the parasite; on the scalp and other hairy parts, the pityrosporon, like certain ringworm fungi, may excite little or no inflammatory response in the cutis, but on the glabrous skin both it and a ringworm fungus provoke definite clinical and histological signs of inflammation.

The acne bacillus flourishes in myriads in the infundibular portion of the pilosebaceous follicles, and there may, like the pityrosporon, provoke both a non-inflammatory and inflammatory defence-reaction—viz., the comedo and the acne pustule. The comedo is a cocoon-like body composed of concentric layers of horny cells, which enclose a mass of the bacilli and inspissated sebum; as Adamson says, it may be looked upon as a reaction upon the part of the horny cells to the invasion of the follicle by the acne bacillus, or, as Whitfield[23] puts it, the epithelium endeavours to deal with the bacillus in the way in which the epidermis always deals with foreign bodies—namely, by encysting it with horny cells. The true acne pustule represents the inflammatory defence-reaction to the bacillus, although it has commonly been held to result from secondary infection with a *Staphylococcus albus*. Sabouraud[24] has clearly shown that the acne bacillus alone is responsible, and he points out that the leucocytic reaction is denser than in staphylococcal infection, producing thick caseous pus, unlike the fluid creamy "laudable pus" of the latter.

Staphylococci are normally present in clean healthy skin at the ostium of the pilosebaceous follicle as isolated units, waiting their opportunity to germinate, multiply, and produce active inflammatory lesions,

Organism.	Habitat.	Defence-reaction.	Lesion.
Pityrosporon.	Stratum corneum.	Exfoliation of horny cells. Cuticular inflammation.	Pellicle or dandruff. Seborrhœide or seborrhœic dermatitis.
Acne bacillus.	Infundibulum of pilosebaceous follicle.	Proliferation of horny cells to enclose it. Dense leucocytic exudation.	Comedo. Acne pustule.
Staphylococcus.	Ostium of follicle.	Polymorphonuclear exudation.	Pustule. Boil. Sycosis, &c.

the simplest of which is a small pustule formed at the mouth of the follicle and surrounding the hair. The normal defence to staphylococcal infection is the polymorphonuclear leucocyte. I cannot here describe the different types of staphylococcal lesion in the skin; they have recently been dealt with by

Sabouraud.[25] The essential points are that the natural habitat for staphylococci is the mouth of the follicle, that the majority of staphylococcal lesions are follicular, and that the formation of pus from polynuclear leucocytes is characteristic.

I may summarise what I have just said in the Table above.

The Symptomatology of the Seborrhœic State.

Some degree of seborrhœa and slight active infection with its triad of organisms are so commonly seen that the entirely non-seborrhœic person, who remains so throughout life, would seem to be exceptional. It will be understood that in the following description I am referring to those in whom seborrhœic manifestations are severe enough to be noticeable, and, as a rule, to demand treatment. Now I think that clinically one can conveniently classify these persons into two types: to one belong the flushed, robust, active, and in later life plethoric sort; I call this the pure or simple seborrhœic type: to the other belong the pallid, thick-skinned, pigmented, hypotonic kind. The former are usually fair, the latter dark or mouse-coloured, but not necessarily so. There are certain differences, as regards their seborrhœic manifestations, between these two groups, and often, I believe, the chief underlying factors predisposing to their seborrhœa are not the same in the two cases.

I will now briefly summarise the symptons of the seborrhœic state:—

Cutaneous Manifestations.

The normal skin, as exemplified by that of the perfectly trained athlete, or as seen in those who have undergone the "sun and air cure," is beautifully smooth, supple, and clear; the horny layer is thin and translucent, and is cast off in invisible flakes, the pilosebaceous orifices are hardly visible, and the secretion of sebum and sweat (except in heat, strong sunlight, and after exercise) is imperceptible; the hair is sleek but not greasy, and there is no evidence whatever in the skin of active bacterial growth.

Contrast this with the skin of the seborrhœic person; as a whole, it appears thickened, coarse, and dirty, particularly in dark-complexioned persons; the horny layer is improperly formed and hypertrophied; the pilosebaceous orifices are enlarged and patulous, and either exude visible droplets of oily sebum, or are filled with solid plugs—the so-called seborrhœic cocoons—containing countless acne bacilli; there is often visible hyperidrosis in certain situations; the scalp after puberty is greasy, covered with adherent dandruff, which swarms with the pityrosporon and the *Staphylococcus albus*, and the hair dank and lifeless. To this picture must be added the infective complications—the comedones, pustules, and nodules of acne, the various forms of seborrhœic dermatitis, the superficial pustules due to the *Staphylococcus albus*, the deeper folliculitis of sycosis and boils due to the *Staphylococcus aureus*. In middle life rosacea, which sooner or later becomes complicated by a superadded infection of the flushed area with the seborrhœic organisms, is common.

Mucous Membranes.

Mouth.—The appearances of the mucous membrane of the lips, mouth, and tongue vary according to the type of seborrhœic person. In the simple type the vermilion borders of *the lips* are usually bright red, and covered with a yellowish, superficial crust, which I call the "seborrhœic scum"; *the tongue* is firm and red, and the papillæ prominent; *gingivitis*, representing doubtless the same lowered resistance to infection that characterises the skin is common, and the earlier the onset of the seborrhœic state, the sooner does it occur. In the other type of seborrhœic person, the lips may be pale or bluish, the tongue pale and indented, and its papillæ hardly visible.

The Teeth.—Dental caries and simple gingivitis are, I consider, the rule, at any rate in the simple seborrhœic; on the other hand, true pyorrhœa alveolaris is not.

Nasopharynx.—Chronic nasopharyngeal catarrh, with frequent exacerbations, is almost invariably present in severe cases of the seborrhœic state. It was a striking symptom among those met with in France during the war. In chronic seborrhœics, with symptoms dating from childhood, this catarrh is usually associated with the adenoid facies and marked hypertrophy of the lymphoid tissue; on the other hand, it may develop as an entirely new symptom in conjunction with infection of the skin, in those who become seborrhœic as a result of adopting a sedentary existence in middle life.

The Digestive System.

Symptoms referable to disorders of the digestive system differ so widely in the two types of seborrhœic, that a detailed discussion of their significance would be futile. Genuine intestinal flatulence, distinct from ærophagy, is a common sympton, due, I believe, to fermentation of carbohydrate, since it is almost always relieved by exclusion of soft carbohydrate foods from the dietary. Observations on the secretion of HCl by the stomach are, so far as I am aware numerous only in cases of rosacea. Ryle and I[26] investigated a small number of patients—all women—and found complete or extreme hypochlorhydria in 58 per cent. In Brown's[27] 50 cases, the percentage was lower—30 per cent.—and Eastwood[28] found a low secretory curve in about half her cases. My impression is that in the simple type of seborrhœic, the gastric HCl is usually normal or excessive, whereas in the other type it is usually diminished.

The Urine.

Sabouraud[29] in 1902 stated that an examination of the urine of 33 men with actively progressing seborrhœic alopecia, but in apparent good health, showed three characteristics—hyperacidity, excess of chloride, and diminution of phosphate. During the war, while working with Semon on large numbers of cases with active seborrhœic infections, I was impressed by the apparently high urinary acidity.[30] In most cases large and in some enormous doses of alkali were required to render the urine alkaline. We were also struck by the beneficial effect of alkalis in large doses in the more acute cases. We expressed the opinion that the character of the military rations and the unavoidable lack of fresh fruit and vegetables were probably in part responsible both for this high urinary acidity, and for the prevalence of seborrhœic manifestations among the troops. The same increased acidity of the urine is also found among civilian patients with acute symptoms of the seborrhœic state, and I believe that a close inquiry along modern lines into this question provides a promising field for biochemical research. One interesting fact is that in certain cases the administration of alkali causes the urine for a while to become progressively more acid.

The Ætiology of the Seborrhœic State.

In considering the ætiology of the seborrhœic state it must be insisted that an apparently excessive secretion of sebum does not necessarily constitute seborrhœa in the pathological sense. It is probable, as Whitfield[31] suggests, that the greasy skin of the healthy negro is a physiological protective response to intense sunlight. The secretion of sebum, like that of sweat, saliva, and tears, is under the control of the autonomic nervous system. Whitfield has remarked on the reflex localised seborrhœa of the forehead resulting from eyestrain, and a similar local secretion of sebum and sweat may be provoked by electrical stimulation of the skin, as is sometimes seen in the treatment of facial blemishes by electrolysis. Of greater interest is the seborrhœic facies that may be met with in *encephalitis lethargica*. This was noted by Cohn[32] and Sarbo[33] in early or acute cases, and Krestin described it as a feature of chronic cases manifesting the Parkinsonian syndrome; it was commonly associated with sialorrhœa and occasionally with

rhinorrhœa. Krestin [34] also noted it, sometimes with sialorrhœa, in cases of senile paralysis agitans. The explanation would seem to be that "these secretory disturbances may depend upon lesions in the neighbourhood of the third ventricle involving vegetative nerve centres."

When we come to consider the factors responsible for the seborrhœic state, as ordinarily met with, we are at once struck by their complexity, but, lest I confuse the issue by attempting to present a comprehensive survey, I would at the outset emphasise what I believe to be the real crux of the problem.

The skin is intimately concerned with fat metabolism. It lies in close contact with the chief fat depôt of the body, its horny layer is permeated with fat, and the sebaceous glands and even the sweat glands secrete it. I find myself in agreement with Darier,[35] Montgomery,[36] and Scholtz,[37] who hold that *the essential and obvious change in the seborrhœic state is an alteration in the secretion and composition of the cutaneous fat*, and it is clearly this modification that favours the parasitic growth of the saprophytes of the skin. When all the minor factors—heredity, age, sexual evolution, &c.—are considered, this one fundamental cause remains predominant. That some similar biochemical change occurs also in mucous membranes would seem probable, in view of their comparable lowered resistance to invasion by saprophytic organisms.

The Influence of Diet and Personal Hygiene.

If we agree that the seborrhœic state is an index of faulty metabolism as regards fat and fat-forming foods, it becomes evident that diet, or rather the correlation between diet and the expenditure of physical energy, is a factor of paramount importance. Granted that there is an inborn and often hereditary tendency to seborrhœic manifestations, nevertheless I believe that all of us are potential seborrhœics. This is suggested by the fact that those, who in their youth have lived athletic outdoor lives, often develop seborrhœa and its complications for the first time when they abandon their games, adopt a sedentary occupation, but continue to eat as much, perhaps more, than previously. The relationship of diet to seborrhœa has been well analysed by Montgomery; he considers in detail the various foodstuffs—sugars, starches, fats, and alcohol—excess of which is a potent predisposing factor. The question is complicated by the fact that excess is not the whole story; the rate of absorption, and probably the liability of certain foods to undergo bacterial fermentation, with fatty acid production, also come into play. Our knowledge, however, of the metabolism in the seborrhœic state is fragmentary and based almost entirely on clinical observations, some of which, it is true, are definite and constant enough to allow of conclusions being drawn, but a complete biochemical investigation of the whole problem is urgently needed, and would, I believe, throw light on much that is now obscure.

Fats.

Our knowledge of the influence of fats on seborrhœa is fairly precise. Kossmann, de Jong, Plate and Röhrmann, Buschke and Fränkel, have all shown that sometimes the sebaceous secretion may have the same chemical characteristics as the fat ingested. The experiments of Policard and Mlle. Tritchovitch [38] explain this and are of great interest.

They are based on the observation of Daddi that sudan-red and scarlet-red, if given with the food by mouth, produce vital staining of depôt fat and adipose tissue. Policard and Tritchovitch showed, however, that only the depôt fat is thus coloured—for example, that of the subcutaneous tissue and omentum, the composition of which depends very largely on that of the fat ingested. On the other hand, the essential fat of the various organs is not stained; in the normal liver, for example, there is found no trace of the dye. If the animal is starved the coloured fat disappears and with it the colouring matter.

These authors then showed that normally the cells of the sebaceous glands elaborate their fatty secretion from the fatty acids circulating in the blood; this, as Regaud and Favre have shown, is a process of true cellular activity. On the other hand, they are capable of fixing directly fatty particles that circulate in the blood, especially after digestion. This fat, unlike the normal sebaceous secretion, is coloured after ingestion of scarlet-red; it is only seen in the large "obese" glands of fat animals, never in normal glands. The fat of fixation is found extending to the periphery of the gland in close contact with the capillaries; the normal sebaceous fat is localised to the centre of the gland near the excretory part. It is thus seen that the normal function of the sebaceous glands is adipogenesis, the manufactured fat having a special composition of its own; under certain conditions—in animals after hyperalimentation, for example—they take on the function of adipopexy, in which case the fat taken up directly from the blood may have the character of that ingested.

From these observations it is easy to understand how the normal sebaceous secretion may be altered either by the excessive intake of fat or fat-forming foods, or by the ingestion of special forms of fat. As I have said, the normal cholesterol fat of sebum is inimical to bacterial growth; but other fats are not, and it is doubtless when the composition of the sebum is changed by the adipopexic function of the sebaceous glands, that the active growth of the saprophytes of the skin are encouraged. This would explain the contention of Kenneth Wills that some cases of acne will yield to the omission of pig-fat from the dietary, and the observations of Whitfield that in some patients cheese will invariably provoke an outbreak of this eruption. As Montgomery points out, milk-fat is particularly liable to bacterial decomposition, hence the danger in seborrhœics of excess of cream or milk.

Apart from fats there is general agreement that excess of carbohydrate aggravates existing seborrhœic manifestations; a girl's complexion may be an index of the number of chocolates she has consumed the previous evening. It would seem that concentrated sweetstuffs and soft starchy foods, which cannot be properly masticated, particularly if cooked with milk, tend to ferment with the production of fatty acids and gas. Sabouraud [39] has emphasised the astonishing effect of merely excluding bread from the dietary of fat seborrhœic people, many of whom consume it mechanically in large quantities at meals which are otherwise adequate or excessive.

Alcohol.

That excess of alcohol promotes seborrhœa is a fact that he who frequents bars can see, but its mode of action is probably complex. It is a vasodilator and through the ages has been recognised as a common cause of true rosacea, which is always accompanied by seborrhœa. I know no more striking clinical experiment than to observe the change that occurs in the complexion of a chronic alcoholic when he is persuaded or compelled to become a teetotaller. Apart from its vasodilator action alcohol is a carbohydrate and fat sparer, since it is so readily oxidised.

It is clear that the influence of diet in seborrhœa must be considered in relation to the mode of life. It is a question of oxidation. The best treatment for the seborrhœic state, apart from dietary restrictions, is a vigorous outdoor life with light clothing in a bracing sunny climate; it is the only one, in fact, that I have found of permanent benefit. Muscular exercise and deep breathing by which complete oxidation is ensured, the action of cool air in stimulating the thyroid-adrenal-sympathetic system, and thereby the metabolic rate, and the direct and indirect influence of sunlight on the skin—these are the important preventive measures. On the other hand, a sedentary life in overheated rooms, a dietary grossly disproportionate to the muscular energy expended, indulgence in alcohol, excessive clothing and lack of personal cleanliness, are the chief predisposing factors.

In conclusion, the adjuvant factors may be briefly reviewed.

Heredity and Predisposition.

That there may be a hereditary and congenital predisposition to the seborrhœic state is, I think, beyond question. Seborrhœic families are common

enough, and conversely certain families appear to be almost immune. I believe heredity to be an important factor in the so-called seborrhœic alopecia—the common baldness of men, or calvities.

Scholtz defines the seborrhœic diathesis as a congenital or hereditary tendency to present certain clinical skin manifestations under the influence of certain dietetic and metabolic factors, and it is unquestionably true that of two persons on approximately the same diet and living under the same conditions the one may become seborrhœic and the other not. At the same time the influence of environment and habits must be borne in mind when estimating the rôle of heredity and predisposition. Parents are apt to apply the same principles of diet and hygiene that their parents applied to them in bringing up their children. The Jews as a race are notoriously liable to seborrhœic manifestations and to diabetes; to what extent this tendency is hereditary or is dependent on their love of fatty and sweet foodstuffs, combined with a disinclination for physical exercise, is difficult to estimate.

Age and Sexual Evolution.

The various manifestations of the seborrhœic state follow in their evolution much the same stages as depicted in Shakespeare's seven ages of man. In infancy the true milk-crust betrays the future seborrhœic; the inevitable infection of its scalp from the parents or nurse with the pityrosporon takes root, and may cause the seborrhœic variety of infantile eczema. This infection persists as dry dandruff of the scalp till puberty, at which time the sebaceous glands awaken into activity. The scalp becomes greasy and covered with the so-called pityriasis steatoides; the micro-bacillus flourishes and gradually produces juvenile acne, which continues until the age of 25 or longer, and is often associated with or succeeded by seborrhœic dermatitis. At 18 or later begins calvities, which follows its relentless course, delayed, perhaps, but never arrested. In the third or fourth decade comes rosacea, and with it the so-called seborrhœic warts, which persist till death. These last, regarded by Darier as late nævi, must be distinguished from the true senile keratoses, picturesquely labelled by the French "fleurs de cimetière," thus implying their tendency to cancerous degeneration.

The Sexual Glands.

It is obvious that the evolution of the various complications of the seborrhœic state is closely connected with that of the sexual organs. The influence of puberty, of menstruation, and of the menopause can clearly be recognised.

The growth of the hair and the activity of the sebaceous glands are intimately related, and on the scalp the greater the latter, the less the former. That this relationship is connected with the endocrine glands concerned in sexual differentiation is certain, but its significance is obscure. Virility tends to loss of hair on the scalp with its increased luxuriance on the beard and body; feminism to a converse distribution. Sabouraud,[40] who has written so entertainingly on this subject, points out that the old satyrs are always depicted as bald on the head and hairy on the body, and the association of baldness, a large beard, and a hairy body was a common one when beards were the fashion. On the other hand, as Sabouraud's researches by proxy in the harems of the East reveal, a eunuch never develops the male type of baldness.

This influence of sex was illustrated in startling fashion by a case of suprarenal tumour in a female patient, which I had the opportunity of observing. There was the usual growth of beard and moustache, and cessation of menstruation, together with loss of hair on the scalp exactly resembling the ordinary male type of baldness. On removal of the tumour, normal menstruation began again, the hair on the face fell off, and a complete regrowth of that on the scalp took place. Unfortunately, recurrence of the malignant tumour was later apparent, and the former symptoms of virilism returned before death.

Intestinal Toxæmia.

I hesitate to employ this term—so simple in application, so difficult to define accurately. At the same time, as I have said, there is a type of seborrhœic person that for want of a better epithet I have labelled the "toxic" type, whose appearance is in marked contrast to that of the flushed, vigorous, "simple" seborrhœic. He is sallow and pigmented, his muscles are hypotonic, his tongue is flabby and furred, his breath foul, and the smell of his skin differs from that of the simple type. Invariably, I think, one finds a large quantity of indican in his urine, and not uncommonly a striking excess of urobilin. He improves out of all knowledge on a diet consisting largely of vegetables, fruits, crisp cereals, nuts, &c., simple laxatives such as rhubarb, and a vigorous out of door life. One girl, belonging to this type, of my acquaintance—a very severe and intractable case of acne—cured herself quickly by joining some cult which enjoins a diet as above, colon wash-outs, and regular breathing exercises.

One has to remember, however, that, as Hurst[41] pointed out long ago, many of the signs and symptoms of so-called intestinal toxæmia are the result of mechanical distension of the rectum by fæcal accumulations, and are at once relieved when these are removed. The well-known experiments of Donaldson[42] on healthy men, I think, prove this conclusively. He showed that deliberate abstention from defæcation for four days, or packing the rectum with cotton, were sufficient not only to produce such symptoms as headache, lassitude, furred tongue, foul breath, flatulence, &c., but also to cause a rise in the basal metabolic rate and of the blood-sugar, increased reaction times, and a diminished capacity for work. The symptoms were all promptly relieved when the rectum was emptied. Moreover, this voluntary constipation caused little or no increase in the urinary excretion of indican. It is probable that, as Mutch[43] suggests, it is in the small intestine—e.g., the lower end of the ileum, and, I think, in the cæcum, but not in the colon—that toxic substances may be produced and absorbed; and we may justifiably conclude that symptoms of so-called toxæmia may result either from mechanical rectal distension or from delay in, and the absorption of products of bacterial action from the small intestine. In the latter case the detoxicating function of the liver must be of importance.

There is clinical evidence to show that both simple constipation and genuine intestinal toxæmia may be factors in aggravating seborrhœic conditions such as acne, but the exact modus operandi is difficult to explain in either case.

REFERENCES.

1. Wilson, Erasmus: Diseases of the Skin, 6th ed., London, 1867.
2. Ormsby, O. S.: Diseases of the Skin, 2nd ed., Philadelphia and New York, 1921, p. 29.
3. Cramer, W.: Fever, Heat Regulation, Climate, and the Thyroid-Adrenal Apparatus, London, 1928, p. 143.
4. Huntington, Ellsworth: Civilisation and Climate, 3rd ed., Yale University Press, 1924.
5. Orbeli, L. A.: Jour. Petrograd Med. Inst., 1923, abstracted in Med. Sci., 1924, x., 486.
6. Horder, T. J.: THE LANCET, 1925, ii., 1210.
7. Barber, H. W.: Guy's Hospital Reports, 1927, lxxvii., 127.
8. Adamson, H. G.: Goulstonian Lectures: THE LANCET, 1912, i., 911, 969, 1041.
9. Sabouraud, R.: Entrétiens Dermatologiques, Paris, 1913, p. 28.
10. Whitfield, A.: Allbutt and Rolleston's System of Medicine, London, 1911, ix., 5.
11. Sabouraud, R.: Pityriasis et Alopécies Pelliculaires, Paris, 1904.
12. Whitfield, A.: Loc. cit. (ref. 10), p. 9.
13. Templeton, H. J.: Arch. Derm. and Syph., 1926, xiv., 270.
14. MacLeod, J. M. H., and Dowling, G. B.: Brit. Jour. Derm. and Syph., 1928, xl., 139.
15. Unna, P. G., and Hodara, M.: Monat. f. prakt. Derm., 1894, xviii., 573.
16. Sabouraud, R.: Séborrhée, Acnés, Calvitie, Paris, 1902.
17. Same author: Ann. de Derm. et de Syph., 1925, vi., 358.
18. Goldsmith, W. N.: Arch. f. Derm. u. Syph., 1925, cxlix., 575.
19. Smith, Ferguson J.: Brit. Jour. Derm. and Syph., 1928, xl., 483.
20. Benians, T. H. C., and Jones, B. H.: THE LANCET, 1929, i., 174.

(Continued at foot of next page.)

"METADYSENTERY,"

WITH REMARKS ON A CHRONIC TYPE.

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SOME years ago I suggested the term "metadysentery" to indicate various clinical types of colitis due to a group of bacilli which I called the metadysentery bacilli. These bacilli may be defined as follows: bacilli which similarly to the true dysentery bacilli (Shiga-Kruse, Flexner, Hiss-Russel, or dysentery-paradysentery bacilli) do not produce gas in any sugar but in contrast to them either clot milk and produce acidity in lactose-peptone-water or produce acidity in lactose-peptone-water without clotting milk. These bacilli were separated by Chalmers and myself (1919) into two groups, the genus Lankoides (milk clotted) and the genus Dysenteroides (milk not clotted); but at times a strain which appears at first not to clot milk may do so later on, and therefore in practice it is of advantage to combine the two groups into one under the term "metadysentery bacilli." It may be added that for this group Jacono has suggested the generic term "Castellanus."

Historical.

Some of the metadysentery bacilli have been known for years. *Bacillus ceylonensis* A and *B. ceylonensis* B were found by me in 1904 and 1905, their description being published in 1907. *B. gintottensis* I described in 1910; *B. madampensis* I isolated in 1910 and described in 1911; the first strain of *B. metadysentericus* was isolated in 1904, but was not named for some years. Chalmers and I created for these organisms two genera, Lankoides and Dysenteroides.

Nabarro has given much attention to this group of organisms; at one time he was inclined to identify them all with *B. coli anaerogenes* of Lembke. In a very interesting publication in the *Journal of Pathology and Bacteriology* in 1923 he says:—

> Lembke, in 1896, isolated from the excreta of dogs a coliform bacillus producing acid but not gas in glucose and lactose media, to which he gave the name *B. coli anaerogenes*. Between 1905 and 1912 Castellani isolated several varieties in Ceylon which he has named *B. ceylonensis*, *B. madampensis*, *B. bentotensis*. These organisms all agree in the property of fermenting sugars, &c., with the formation of acid alone, the difference between them being of a minor nature.

Nabarro further states that he first isolated *B. coli anaerogenes* in 1912, from a case of dysentery at the Wakefield Asylum. In 1921, during an investigation upon summer diarrhœa and other diarrhœal conditions in children, he isolated 30 strains of *B. coli anaerogenes* from 25 patients out of 107 investigated. It would appear, however, that the true *B. coli anaerogenes* produces acidity in great amount and very rapidly, and after repeated transplantations produces gas in certain carbohydrates.

Principal Types of Metadysentery Bacilli.

The following bacilli may be considered to belong to the group of metadysentery bacilli:—

(1) *Bacillus pyogenes fœtidus* Passet (1902). This and similar organisms, although belonging culturally and biochemically to the metadysentery group, do no seem to cause dysenteric symptoms or colitis symptoms. They were found in cases of abscesses. An interesting feature is that they are motile. (2) The bacilli found by me in certain cases of colitis and dysentery with or without fever, which I described with the names *Bacillus ceylonensis* A, *B. ceylonensis* B, *B. metadysentericus*. In addition to these bacilli, *B. gintottensis* and *B. madampensis* which do not seem to be pathogenic. (3) *Bacillus bentotensis* Castellani (1912). This bacillus was isolated by me in Ceylon in stools; it is motile, and with regard to this character is similar to *B. pyogenes fœtidus* from which, however, it differs with regard to biochemical reactions. (4) Several of the strains found by Duval in cases of infantile diarrhœa, in America, seem to me to belong to the metadysentery bacilli rather than the paradysentery group (Flexner). (5) Certain strains found by Nabarro, in England, in cases of infantile diarrhœa, although Nabarro, until recently identified them with *B. coli anaerogenes*. (6) The strains found in recent years by Sonne and others in certain cases of dysentery, although these may be identical with *B. ceylonensis* A, *B. ceylonensis* B, and *B. metadysentericus*.

I do not place among the metadysentery bacilli the *Bacillus coli anaerogenes* found by Lembke in dogs, as apparently after repeated transplantations it produces gas.

The pathogenic metadysentery bacilli may be separated into two principal types: (1) *B. ceylonensis* A type (including *B. metadysentericus*) and (2) *B. ceylonensis* B type. In the first type acidity in lactose-peptone-water is produced very slowly and may be almost absent, clotting of milk is slow or absent; indol negative or only a trace. In the second type production of acidity in lactose is rapid, clotting of milk fairly rapid, indol usually positive. Serologically, especially using my absorption method, several subgroups may be differentiated.

Bacteriological Description of the Various Species.

This has been given in a number of previous papers; among the recent ones I may mention one in the *American Journal of Tropical Medicine*, July, 1927, with the title, The Classification of Bacterial Dysenteries and of Dysentery Bacilli. There is therefore no need to enter into details, but the table showing the characters of the more important species may be found useful.

Clinical Syndromes: Chronic Metadysentery.

The clinical intestinal conditions in which organisms of the metadysentery group of bacilli have been isolated may be classified into: (*a*) *Acute*. With either dysenteric diarrhœa or simple diarrhœa. In certain cases fever may be present. (*b*) *Chronic*. Several types. These organisms have also been found at times in obscure cases of fever in which intestinal symptoms may be very slight or lacking altogether, and paratyphoid has been suspected. I have under treatment at the present time one such case in London.

In this paper I propose to discuss again a chronic type characterised by recurrent attacks of simple

LETTSOMIAN LECTURES: REFERENCES.

(*Continued from previous page.*)

21. Cedercreutz, A.: Travail du Laboratoise de la Ville de Paris à l'hôpital Saint-Louis, Paris, 1901.
22. Benians, T. H. C.: Brit. Jour. Derm. and Syph., 1915, xxvii., 394.
23. Whitfield, A.: Skin Diseases and their Treatment, 2nd ed., London, 1921, p. 124.
24. Sabouraud, R.: Ann. de Derm. et de Syph., 1925, vi., 374.
25. Same author and publication, 1925, vi., 354, 417; Ibid., 1926, vii., 1, 129, 403; and Pyodermites et Eczémas, Paris, 1928.
26. Ryle, J. A., and Barber, H. W.: THE LANCET, 1920, ii., 1195.
27. Brown, W. H.: Brit. Jour. Derm. and Syph., 1925, xxxvii., 213.
28. Eastwood, S. R.: Ibid., 1928, xl., 91 and 148.
29. Sabouraud, R.: Loc. cit. (ref. 16), p. 139.
30. Barber, H. W., and Semon, H. C.: Brit. Med. Jour., 1918, ii., 245.
31. Whitfield, A.: Skin Diseases and their Treatment, 2nd ed., London, 1921, p. 119.
32. Cohn, T.: Neurol. Centralblatt, 1920, xxxix., 260.
33. Sarbo, A.: Ibid., 1920, xxxix., 498.
34. Krestin, D.: Quart. Jour. Med., 1927, xxi., 177.
35. Darier, J.: Précis de Dermatologie, 4th ed., Paris, 1928, p. 248.
36. Montgomery, D.: Jour. Cut. Dis., 1916, xxxiv., 829.
37. Scholtz, M.: Med. Jour. and Record, 1924, cxix., 344.
38. Policard, A., and Tritchovitch, J.: Lyon Méd., 1922, cxxxi., 981.
39. Sabouraud, R.: Entrétiens Dermatologiques, Paris, 1922, p. 196.
40. Same author and publication, 1913, p. 1.
41. Hurst, A.: Constipation and Allied Intestinal Disorders, London, 1909, p. 164.
42. Donaldson, A. N.: Jour. Amer. Med. Assoc., 1922, lxxviii., 884.
43. Mutch, N.: Brit. Jour. Surg., 1915, ii., 608.

diarrhœa with absence or only occasional presence of dysenteric symptoms. The stools during the attack are fluid, brownish or yellow, at times frothy; as a rule, they do not contain muco-pus or blood, but there are a number of exceptions. Each attack may begin suddenly with severe abdominal pain, or only abdominal discomfort may be felt; it lasts from a few hours to several days. In the intervals between the attacks, and the intervals may be very prolonged, the patient may feel fairly well, but as a rule complains at times of light abdominal discomfort and flatulence; he often feels run down, tired, nervy, and not inclined for work. These cases go on for years, a little better, a little worse; they consult many practitioners, and are generally told they are suffering from colitis, or intestinal intoxication, or intestinal subinfection; sometimes the diagnosis mucous colitis and abdominal neurasthenia is made. Not rarely atypical appendicitis is suspected and the patient is operated on. Similarly, atypical cholecystitis may be suspected. The patients try all sorts of treatment, Plombière's douching being probably the most popular and next to it streptococcal vaccines and various so-called intestinal disinfectants. The result is generally unsatisfactory. Some of these patients have a wretched life and are a burden to themselves and their families.

TABLE SHOWING BIOCHEMICAL CHARACTERS OF CERTAIN BACILLI OF THE METADYSENTERY GROUP.

(Reactions After an Incubation Period of Three Weeks at 37° C.)

—	Motility.	Gram.	Gelatine.	Serum.	Litmus milk.	Lactose.	Glucose.	Lævulose.	Maltose.	Galactose.	Mannitol.	Dulcitol.	Saccharose.	Inulin.	Rhamnose.	Inositol.	Adonitol.	Arabinose.	Amygdolin.	Salicin.	Sorbitol.	Raffinose.	Dextrin.	Erythritol.	Glycerol.	Potato starch.	Indol.	Lead agar.	
B. ceylonensis A, 1907* (St. P.D.).	0	0	0	0	AG	0 or Avs	A	A	A	A	A	0	A	0	A	0	0	A	0	0	0	A	As	0	A	0	0	0	See Note 1.
Ditto, 1907* (St. Ceylon O).	0	0	0	0	AG	0	A	A	A	A	0 or A	0	0 or A	0	0 or A	0	0	A	0	0	0	A	Avs	0	0 or A	0	0	—	
Ditto, 1907* (St. Z).	0	0	0	0	AG	A	A	A	A	A	A	0	A	0	A	0	0	A	0	0	0	A	0	0	A	0	0	0	
Ditto, 1907* (Var. II., St. Sh.).	0	0	0	0	AG	As	A	A	A	A	A	0	0	0	A	0	0	A	0	0	0	0	A	0	0	—	0	—	
Ditto, 1907* (St. R.R.).	0	0	0	0	AG	A	A	A	A	A	A	A	0 or A	0	A	0	0	A	0	0	A	A	A	0	A	0 or A	+	0	See Note 2.
Ditto, 1907* (St. R.W.).	0	0	0	0	AG	As	A	A	A	A	A	A	0 or A	0	A	0	0	A	0	0	A	A	0	0	A	0 or A	+	0	
Ditto, 1907* (St. L.V.).	0	0	0	0	AG	A	A	A	A	A	A	A	A	0	A	0	0	A	0	0	A	A	A	0	A	A	+	0	
Ditto, 1907* (St. Ceylon O.).	0	0	0	0	AG	A	A	A	A	A	A	A	0 or A	0	A	0	0	A	0	0	A	A	A	0	A	A	+	0	
B. metadysentericus, 1904* (Var. A.).	0	0	0	0	A	A	A	A	A	As	A	0 or As	A	0	—	—	—	—	—	—	—	—	—	—	—	—	+ 0	—	See Note 3.
Ditto, 1904* (Var. A., St. Z.).	0	0	0	0	A	A	A	A	A	A	0 or A	0	A	0	A	0	0	A	0	0	0	A	0	0	0	0	+ 0	—	
Ditto, 1904* (Var. B., St. L.).	0	0	0	0	A	A	A	A	A	A	0 or As	0 or As	0 or As	0	0 or A	0	0	A	0	0	A	A	A	0	A	—	+	—	
Ditto, 1904* (Var. C.).	0	0	0	0	A Alk D	As	A	A	As	A	0 or Avs	0 or Avs	0 or Avs	—	—	—	—	—	—	—	—	—	—	—	—	—	0	—	
Ditto, 1904* (Var. D.).	0	0	0	0	Alk	As	A	A	A	A	A	A	A	—	—	—	—	—	—	—	—	—	—	—	—	—	+	—	
B. bentotensis, 1912* (St. O.).	+	0	0	0	A or Alk	A	A	A	A	A	0	0 or As	A	0	0	A	0	0	0	0 or As	0	0 or As	0	0	A	—	+	—	
Ditto, 1912* (St. L.).	+	0	0	0	AG	A	A	A	A	A	A	0	0	0	A	0	0	A	A	A	0	0	A	0	As	—	+	—	
B. madampensis, 1911* St. H.).	0	0	0	0	AG	A	A	A	A	A	A	0	As	0	A	0	0	A	0	0	Avs	A	A	0	A	0	+	0	
B. pyogenes fœtidus, 1902.†	+	0	0	0	AG	A	A	A	A	A	A	A	A	—	—	—	—	A	—	—	—	A	A	—	—	—	+	—	

* Castellani; † Passet. St., strain. 0 = negative, viz., absence of clotting in milk, absence of acidity and gas in sugar media (the medium may become alkaline). + = positive, viz., presence of clotting in milk, presence of acidity and gas in sugar media, &c. A = acid. AG = acid and gas. Alk = alkaline. — = reaction unknown. As = acid slightly. Avs = acid very slightly. D = decolorised.

Note 1.—Some strains of *Bacillus ceylonensis* A at first produce acid in glucose and lævulose only, lactose is not fermented or only very slowly; milk is clotted very slowly. Strains P.D., O., Z., are serologically identical. Strain Sh. differs serologically.

Note 2.—The four strains of *Bacillus ceylonensis* B are serologically identical; strains R.R. and O. produce acidity in lactose rapidly; strain R.W. very slowly.

Note 3.—Certain strains may clot milk after prolonged incubation.

Illustrative Cases.

CASE 1.—Mrs. A. for two years before being seen by me had been suffering at intervals from attacks of diarrhœa with severe abdominal pains, the stools being brownish or yellowish, at times somewhat frothy, never containing any blood. She came to consult me in June, 1926. A bacillus was isolated from the stools, with the characters of the bacilli of the metadysentery group—viz., produced no gas in any sugar, produced acidity in lactose, clotted milk slowly. The blood agglutinated the bacillus isolated from the stool up to a dilution of 1 in 160, and the laboratory strain of *B. ceylonensis* B up to a dilution of 1 in 120. The bacillus was not agglutinated by blood of normal individuals. A powerful Shiga serum (titre for Shiga, 1 : 1000) obtained from Burroughs Wellcome, agglutinated it only up to 1 in 20. The lady was admitted to a tropical nursing home and was kept at complete rest in bed and on fluid diet. A course of *ceylonensis* B vaccine (peptone-water cultures killed by the addition of carbolic ½ per cent.) was given in minute doses. She gradually got better, and up to the present day has not had any more attacks. The agglutination for the bacillus isolated from the stools rapidly decreased; it is now negative.

CASE 2.—Mrs. B., an Englishwoman, had an acute attack of diarrhœa, she thinks, with a little blood and mucus, but does not remember with certainty, 14 years ago in Rome. She did not go to see a doctor, and did not even go to bed; since then she has never been quite well. Very often she has had abdominal discomfort and flatulence; as a rule, however, no diarrhœa. She came to consult me in August, 1926, because she was passing through a period of reacutisation with diarrhœa, the stools being liquid, of a brownish colour. A bacillus was isolated from the stool with the following characteristics: slow clotting of milk, no production of gas in any sugar, acidity in glucose. I thought at first that lactose was negative, but after three weeks a slight amount of acid developed. Serologically, the organism was identical with a strain of *B. ceylonensis* A isolated in Ceylon. The bacillus isolated from the stool was agglutinated by the patient's blood in a very high dilution (1 in 320); the laboratory strain of *B. ceylonensis* A was agglutinated in a dilution of 1 in 160.

CASE 3.—Mrs. H. has been suffering from rather obscure abdominal symptoms for many years; abdominal discomfort, flatulency, attacks of simple diarrhœa followed by long periods of constipation; there was apparently at times slight tenderness in the right lower abdomen; appendicitis was suspected and an operation was performed. The appendix did not seem to be diseased. The lady came to consult me in August, 1926, merely complaining of vague abdominal discomfort and of always feeling tired

and ill. The blood showed high agglutination (more than 1 : 160) both for *B. ceylonensis* A and for *B. ceylonensis* B, all strains; none for *B. madampensis*.

Three strains of metadysentery bacilli were isolated from stools; one was agglutinated by patient's blood and by *B. ceylonensis* B serum; the third strain was not agglutinated by either the patient's serum or *B. ceylonensis* A or *B. ceylonensis* B sera. The third organism appeared to be identical with *B. madampensis*. It seems, therefore, that in this case the condition was probably due to a mixed infection—*B. ceylonensis* B and *B. ceylonensis* A.

I am indebted to Sir William Simpson for carrying out the necessary inoculations in rabbits to obtain the specific sera.

I may quote two cases of colitis with fever described by me in 1907.

(1) An Australian medical man, 24 years of age, arrived at Colombo from China in April, 1905. A week before reaching Colombo he began to feel ill with lassitude, headaches, diarrhœa—10 to 15 motions daily with no mucus or blood—irregular low fever. The disease lasted two months. The diarrhœa was followed by a long period of constipation. The convalescence was very prolonged, the patient suffering repeatedly from attacks of nervous tachycardia. A bacillus was isolated which clotted milk and produced acidity, but no gas in many sugars; I gave a description of the bacillus and called it *B. ceylonensis* B. The original strain is still in my possession.

(2) A retired German officer. Strongly built man, 50 years of age. No previous disease of any kind. Began to feel ill with malaise while on board a German steamer during the voyage from Aden to Colombo; irregular rises of temperature; slight diarrhœa. He never felt ill enough to remain in his cabin. As there was a case of enteric on board, the same disease was suspected in this patient, and he was accordingly advised to land at Colombo. During the first three days after landing in Colombo he felt quite well and was getting ready to go up country when suddenly, in the afternoon, his temperature rose to 103·2° F. There was slight shivering, severe headache, diarrhœa becoming a prominent symptom, 12 liquid motions being passed in a few hours. I saw the patient in the evening; temperature 102·4°, pulse 78; no roseola or any other rash; examination of the chest negative; spleen not enlarged; the stools, which were liquid and yellowish, did not contain blood or muco-pus. The fever lasted 16 days longer and its course was very irregular. The pulse always remained slow. The spleen could never be palpated, and roseola spots never appeared. The diarrhœa lasted for three days, and the stools never contained blood. The analysis of the urine was negative. Except during the first four days the patient did not complain of headache or of any serious subjective symptom.

Treatment consisted in the exhibition of the usual intestinal antiseptics and in keeping the patient on liquid diet. From the stools an organism was isolated which clotted milk, slowly produced acidity in glucose, but not in lactose (readings taken on the seventh day). I called the bacillus *B. ceylonensis* A. After several transplantations it became capable later on of producing acidity in a number of sugars, and it may produce slight acidity in lactose after two or three weeks' incubation.

Diagnosis and Distribution.

Diagnosis is difficult; the bacteriological examination of the stools may be negative very many times before metadysentery organisms are found. In the chronic cases what I have found most helpful is testing the blood for agglutination for the principal varieties of the group. My routine procedure is to test the blood of every suspicious case for agglutination for *B. ceylonensis* B, *B. ceylonensis* A, and *B. metadysentericus*. When the agglutination is higher than 1 in 80, as a rule repeated bacteriological examinations of the stools will reveal sooner or later the presence of metadysentery organisms, although, as I have already stated, many examinations may have to be carried out before a successful one is obtained. The stool for examination must be absolutely fresh.

The colonies on MacConkey's agar plates are delicate and after a day or two may have a pinkish or reddish colour.

A very similar chronic clinical syndrome may be found caused by *E. histolytica*; very rarely by bacilli of the true dysenteric group (Shiga-Kruse, Flexner, and Hiss-Russel or dysentery-paradysentery group). Only repeated and thorough microscopical and bacteriological examinations will enable one to make a differential diagnosis.

The condition is a cosmopolitan one; I have studied cases in which the infection was apparently contracted in Ceylon, India, Italy, the Balkans, Spain, France, Germany, the United States, and this country.

Conclusion.

The term metadysentery may be used to indicate a group of colites due to the metadysentery bacilli—viz., bacilli which in contrast to the true dysentery bacilli (Shiga-Kruse, Flexner, Hiss-Russel, or dysentery-paradysentery bacilli) either clot milk and produce acidity in lactose-peptone-water, or clot milk without producing distinct acidity in lactose-peptone-water, or produce acidity in lactose-peptone-water without clotting milk. This group of bacilli includes *Bacillus ceylonensis* A, *B. ceylonensis* B, *B. metadysentericus*, and several others.

In this paper attention has again been called to a chronic type of colitis due to the above-mentioned bacilli which in my experience is far from rare. In this type true dysenteric symptoms with blood and muco-pus in the stool are usually, though not always, lacking. The patient feels tired, nervy, has no appetite, complains of flatulence with occasional attacks of simple diarrhœa followed at times by long periods of constipation. The diagnosis is based on the presence in the blood of specific agglutinins and on the repeated bacteriological examination of the stool.

Literature.

Castellani: Cases of Fever Confounded with Typhoid, Jour. of Hyg., 1907, vii., 1.
Idem: Reports of the Advisory Committee for the Tropical Diseases Research Fund, 1911.
Idem: Observations on Some Intestinal Bacteria Found in Man, Centralblatt f. Bakt., 1912, lxv., 262.
Idem: Infezioni tifiche, Paratifiche e miste della zona Adriatico-Balcanica, Ann. di. Med. Nav. e Col., 1916, ii., 453.
Idem: Alcune osservazioni sulla etiologia, diagnosi e cura della dissenteria, ibid., 1918, i., 52.
Idem: Reports of the Inter-Allied Sanitary Commission, Office International d'Hygiene Publique, 1918–19.
Castellani and Chalmers, A. J.: Chapters on Classification of Bacteria, Manual of Tropical Medicine, London, 1919.
Castellani: Classification de certains groups de bacilles aerobies de l'intestin humain, Ann. de l'Inst. Pasteur, 1920, ix., 600.
Idem: Classification of Bacterial Dysenteries and of Dysentery Bacilli, Amer. Jour. Trop. Med., 1927, vii., 199.
Idem: Observations on a Little-known Group of Anaerogenic Intestinal Bacteria, Proc. Roy. Soc. Med. (Sect. Path.), 1927, xx., 21.
Nabarro, D.: Jour. Path. and Bact., 1923, xxvi., 429.
Olivi, G.: The Virulence of Bacillus Metadysentericus (Castellani) in the Rabbit, Jour. Trop. Med. and Hyg., 1923, xxiv., 123.

SOME POINTS IN THE DIAGNOSIS OF CARDIAC LESIONS IN CHILDREN.

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Children, like patients of all ages, are brought to the physician from time to time for an opinion on the soundness of their hearts. It may be that some symptom, referable at least in the mother's opinion to the heart, has made her anxious; it may be that doubts or aspersions have been cast on the heart in the course of a routine examination at school or elsewhere.

The problem presented is of the greatest possible importance, and it is extremely desirable to reach a definite conclusion and to give an unequivocal opinion. If the heart is the seat of active disease, absolute rest is the first requisite for recovery, and it is wrong that the child should be up and about. If the heart has some congenital or acquired structural defect but healthy musculature, the problem is to determine as nearly as may be its powers and limita-

tions, to explain the situation to the parents, and to plan the child's days so that work, play, and happiness are as little interfered with as possible. If the heart whose healthiness has been called in question is, in reality, sound, the importance of pronouncing it to be so can scarcely be exaggerated. To play for imagined safety by describing a heart of whose condition one is in doubt as "weak," and counselling a vague carefulness, is, in reality, to run the very grave risk of fixing upon the child a lifelong burden of fear, spoiling its happiness and usefulness, and perhaps even of manufacturing a chronic invalid. If there is doubt, as sometimes there is bound to be, the condition should be pronounced doubtful and diagnosis suspended for a limited period until it can be established with certainty. The position once explained and accepted, an interim régime can be prescribed which may be allowed to err on the side of caution, but the necessity of establishing the diagnosis at the earliest possible moment must never be forgotten.

Thus, the problems of cardiology in childhood have a special importance and urgency; first, because the child's heart has far greater powers of recovery and adaptation than the adult's; and, secondly, because the child, more than the adult, is dependent on our judgment; what we say about the heart may have lifelong consequences, and it is our bounden duty to make sure of the truth before we speak.

Although the degenerations in muscle and vessels which complicate the problem after middle life are absent, the position of the heart in the chest is relatively variable and is easily affected by exocardial factors, murmurs of all kinds are commoner than at any other time of life, the heart and blood-vessels are especially sensitive to nervous influences, and the heart muscle, though immune from degenerations, is relatively susceptible to intoxications and inflammations. The liability of children to rheumatism makes it particularly necessary to consider whether any lesion which may be found is active or not.

Investigation of the Case.

No attempt will here be made to describe or classify the many conditions which may be met with. It is intended rather to indicate how investigation can best be carried out, and to discuss the relative value of various symptoms and signs in the child as compared with the adult. The methods of investigation which can be employed are history-taking, physical examination, efficiency tests and instrumental investigation by means of skiagram, electrocardiogram or otherwise—of which direct examination is, in these cases, the most valuable.

The *history* is of less value than in an adult with similar complaints, especially as the greater part of it cannot be obtained from the patient himself. It is important to consider the type of parent who is giving it, and so to form some opinion of the weight which may be attached to the story, and more especially of the kind of influences to which the child is subject at home. If the mother has been told already that the child has a "weak" heart, she should always be asked what, if anything, she noticed to be amiss before this time. In this way it is possible to disentangle the actual features from those which may have been suggested by previous questions or which an anxious parent imagines to be appropriate to the occasion.

Under *family history* inquiry should be made into rheumatism and rheumatic heart disease. A definite history of acute rheumatism, chorea, or valvular disease of the heart in a near relative should be given some weight, but it should be remembered that the expression "rheumatism" when used of adults connotes, in lay parlance, almost any kind of pain not having an obvious cause, and that some form of heart disease or heart failure overtakes many previously healthy people in the late years of their lives. It must also be remembered that acute rheumatism occurs often enough in a single member of a healthy family. It is useful as an aid in the assessment of symptoms to know whether the patient is an only child, the baby of the family, or even the only girl in a large family of boys. Any one of these states has power to produce, and still more to magnify, subjective or functional symptoms.

In the individual child *symptoms* may be many, few, or none, and their value is most difficult to assess. The relevant ones fall into two classes, those of conditions causing cardiac damage and those referable to such damage.

Of the first, the "rheumatic group" is, of course, by far the most important. A definite history of acute articular rheumatism or of chorea is of the utmost significance, and may rightly be allowed to colour our view of doubtful physical signs. A history of tonsillitis, especially if recurrent, and of scarlet fever is also important, but it is questionable policy to search by leading questions for the "minor manifestations" of rheumatic infection. A history of occasional aches and pains, of transient fever, sore-throats, or fidgetiness can be elicited in a large proportion of all children. Whether it emerges probably depends at least as much on the mentality of the mother and child and the outlook of the doctor as on any physical factor, and neither its presence nor its absence should be allowed much weight. A definite account of "growing pains" cannot be ignored, but should not be over-valued in estimating the state of the heart. The insidious type of mitral stenosis, which is suspected far more often than it is found, develops quite independently of any history of rheumatism.

Symptoms referable to the heart itself are fewer and less reliable in children than in adults, and considerable lesions, especially of the mitral valve, may exist without producing any noticeable general effect. In young adults dyspnœa on exertion and œdema of the feet are relatively early and constant symptoms of myocardial weakness; in children both are uncommon, and both, but especially the second, indicate an advanced and serious degree of cardiac insufficiency. The place of dyspnœa as an early symptom is, to some extent, taken by listlessness and disinclination for activity, which, in a child of previously energetic disposition, are somewhat suggestive of cardiac insufficiency. Cyanosis, except in congenital lesions, is also uncommon and of serious import; the same may be said of cough.

There have also to be considered symptoms which parents ascribe to the heart, though the medical man is less likely to do so. Such are præcordial pain, fainting, palpitation, and changes of colour. Of these, it may be said that though any or all of them *may* be due to heart trouble, this is their least common cause. An attempt must be made, however, to explain them and to assess their value, and in doing so, it is of the first importance to discover the circumstances in which the symptom occurred. A faint at the dentist's has a very different complexion from a faint after running upstairs, and, in general, it is true to say that unless brought on by exertion such symptoms do not reflect on the heart's efficiency, and by no means always even then. Thus it often happens that but little help is to be got from history and symptoms, however carefully investigated, and we must turn to the *examination* of the child.

This examination must be thorough and general, and on no account be limited to the heart alone. The child's general aspect is of some importance and assistance. The thin sallow child of poor physique, often with dilated pupils and brisk reflexes, is not a typical rheumatic subject, but is prone to vasomotor disturbances including "functional" murmurs, and also to subjective symptoms arising from introspection and anxiety. The resemblance of these children to one or other parent in both physical and mental make-up is often striking and materially assists diagnosis. If the mother has the same pasty, anxious, and debilitated appearance as the child, but no heart disease, we should be chary of blaming the child's heart for his ill-looks; an inheritance, mental

outlook, and environment common to both are much more likely to be the cause.

A child under 5 is unlikely, and one under 3 very unlikely, to have rheumatic heart disease. The typical rheumatic subject is a well-grown, well-nourished, and pleasant-looking girl of 10 to 16 who, unless the infection is active or the heart seriously damaged, presents little appearance of ill-health. If the disease is appreciably active there is almost always some degree of pallor with general listlessness and apathy. The pallor of aortic incompetence and the cyanosis of congenital pulmonary stenosis, and (though much less) of severe mitral stenosis are well known, but there is no facies of minor mitral lesions or of slight myocardial insufficiency. Severe valvular lesions, acquired early in life, gravely impair nutrition and growth.

The condition of the tonsils and tonsillar glands should always be noted, and attention may then be turned to the heart itself. There can be no exception to the rule that every heart should be examined in the erect and recumbent positions, and to this may well be added examination in the left lateral position and after exercise.

Inspection in severe cases may show præcordial bulging, which occurs more readily in children than in adults, and it will generally show whether the heart is acting quietly or excitedly and give some information as to the position, mobility, and character of the apex-beat—information which will be extended and confirmed by palpation. It is not always recognised that the position of the apex-beat is not the same in children as in adults. Until the age of 5 it is generally in the fourth space, with each succeeding year more commonly in the fifth, where it is established by puberty. Not only is it higher than in adults, it is also further out. It is definitely outside the nipple line in the first four or five years of life, in it until the age of 10 and internal to it by 14. It is higher and nearer the middle line when the child is lying down than when he is erect. These variations are associated with the fact that the heart is more horizontal and is relatively larger in childhood than in adult life, and also with changes in the shape of the chest. The point which is chiefly to be noted is that an apex-beat in the nipple line in a child under 14 is not, in itself, evidence of cardiac enlargement or displacement.

Very valuable information about the character of the heart-beat and the presence or absence of hypertrophy is gained by palpation with the flat of the hand, and this should never be omitted. The size of the heart should be judged chiefly by percussion which, in children, with their relatively thin chest walls, gives clear-cut and convincing results. In auscultation, again owing to the thin chest wall, both normal and adventitious sounds are heard distinctly, and murmurs are often diffuse. Reduplication or splitting of either sound is common and of little importance. In young children the pulmonary second sound is distinctly louder than the aortic. This may persist as late as puberty, and in no way supports a tentative diagnosis of mitral disease. The so-called third heart sound deserves attention because it is apt to be mistaken for the mid-diastolic murmur of mitral stenosis. It is heard near the apex of the heart in quite a large proportion of children, and consists of a short sound, occurring in diastole rather longer after the first sound than a reduplication. It is said to be due to the sudden tension of the mitral valve in diastole and has no evil significance. It may be added that normal sounds, quiet, orderly, and of good tone, are strong presumptive evidence of the heart's integrity and should not be lightly disregarded.

Murmurs are responsible for more troubles and difficulties than all other cardiac signs and symptoms put together, and are to be heard in a large proportion of children at one time or another. They may be divided according to their significance into three groups: transient or accidental murmurs which are of no pathological significance, tempora v or atonic murmurs due to a relaxation of the nor al tone of the myocardium, and permanent or organic murmurs which may be congenital or acquired.

The first are very common, and are notably inconstant and variable. They are systolic in time, usually heard best at the apex or pulmonary base, are not transmitted or accompanied by thrills or by evidence of cardiac enlargement or insufficiency. They vary in loudness but can, as a rule, be distinguished without much difficulty. In cases of doubt, a second examination after an interval will often settle the question.

Atonic murmurs may occur in anæmia or in any toxic or infective state. They are soft blowing sounds, localised, or, at most, conducted for only a short distance. One of the commonest varieties is a systolic murmur, heard at the apex, and due to mitral incompetence. Only the course of events can show with certainty whether this incompetence is due to endocarditis or to a temporary yielding of the mitral orifice. If there is reason to suspect active or recent myocarditis or myocardial intoxication and if the murmur is soft, purely systolic, and not very widely conducted it is wise to assume that it is not due to endocarditis until it proves itself to be so by persisting when the myocardium has recovered beyond dispute. This may take time. Such murmurs may persist in spite of six or eight months' rest in bed, and then disappear completely with the return of full myocardial efficiency.

The classical signs of mitral stenosis—the rough crescendo presystolic bruit with its thrill and slapping first sound—occur only when the lesion is established. In a child the sign of developing stenosis is not a roughening of the first sound, but a mid-diastolic murmur, best heard and sometimes only heard after exercise. It must be searched for with care, and if it be found it is wise to confirm its presence by a second examination, having regard especially to its relation to exercise, before it is made the basis of a definite diagnosis. It must be remembered that a diagnosis of mitral stenosis carries with it weighty and serious implications as to permissible exercise and probable length of life. If it is overlooked when present the child's chance of acquiring compensation may be jeopardised; if it is wrongly diagnosed, a potentially happy and useful life may be changed to one of anxiety and invalidism.

The signs of aortic lesions in children are essentially the same as in adults. They are usually associated with mitral lesions, but are much less common. Pure stenosis is extremely rare. The diastolic murmur of incompetence is easily overlooked; it is soft, sometimes very soft, and is generally best heard to the left of the sternum rather than at the aortic base. A certain amount of incompetence may result simply from loss of muscle tone, but this is much less common than at the mitral valve. When it occurs, it is perhaps most frequently in association with a severe anæmia.

In many cases some form of exercise-tolerance test is necessary in order to gauge the functional efficiency of the heart. A standard exercise should be performed, the manner of its performance be noted, the pulse counted, and the heart examined as with adults, but the result in children must be weighed with caution. Not only is the "normal" pulse-rate far more variable in children than in adults, but it is also more readily disturbed by emotion or excitement. Many children exhibit a tachycardia whenever they are examined, no matter how well they know the doctor, and the acceleration of the pulse after exercise is often obviously due in part to the excitement of performing it and will persist while the feeling of excitement lasts, often for much longer than the standard one or two minutes. In such children the manner of performing the test, the child's colour, and the presence or absence of dyspnœa are the best indications of the heart's response to the effort, and none of these is infallible.

Serious disorders of rhythm are rare in children. Sinus arrhythmia—the rhythmic variation in gear with the respiratory movements—is normal and often

narked; a few deep slow breaths should suffice to differentiate it from other forms. It disappears on exercise and in general myocardial infections and ntoxications, and its return in these latter cases is a ign of myocardial convalescence. Premature contractions or "extrasystoles" can be identified by he combined use of a finger on the pulse and a tethoscope at the apex. Unless very frequent or licited instead of abolished by exercise they are f little import. Other disorders of rhythm are, in hildren, decidedly rare.

In difficult cases, when, for example, the significance r insignificance of an unusual murmur has to be letermined and clinical evidence is not conclusive, aluable help may be gained from X rays or the lectrocardiograph, but in most cases all pertinent uestions can be answered without them.

Summary and Conclusions.

An attempt has been made to indicate the main differences between child and adult cardiology, and o point out some of the problems peculiar to children nd how they may be faced.

The diagnosis of fully developed lesions is, on the hole, easier in children than in adults and even rognosis is in some respects less difficult than it ecomes after middle life, but the problem of the arly developing lesion is at times one of great ifficulty. To form an opinion on the state of the eart at the moment of examination may not be hard, ut there will arise in the mind the question "is this eart the seat of active infection—is this slight bnormality the first sign of serious trouble?" To nswer this question a thorough and general investiation of the child and his history will be necessary, nd in some cases a period of observation while the iagnosis remains in doubt cannot be avoided. Such ases are, however, the exception and not the rule. n very many cases brought up for decision the iagnosis of "healthy heart in a healthy child" can e made with confidence. In another group the ature and degree of cardiac damage can be stated ith reasonable certainty, present infection excluded, suitable régime instituted, and a watch kept for any ecurrence of active trouble. In doubtful cases the ecessity for reaching a decision at the earliest possible oment should never be forgotten.

The insidious nature of the rheumatic infection and he variety of its manifestations has lately been mphasised and even advertised. Parents, teachers, nd others responsible for the health of children take arly and serious note of fidgetiness and limb pains hough perhaps less than they might of febricula and onsillitis). The doctor, knowing well what damage heumatic infection can do is tempted to an attitude f extreme caution. This is, from one point of view, mply justifiable, but it must be remembered that hile childhood is the time when rheumatic infection oes its worst, it is also the time when accidental and nsignificant murmurs are commonest and the pulsete most variable and easily disturbed, and further, is the time when character and mental outlook are eing formed. Six months of rest in bed to recover om cardiac dilatation may prove to be soundly nvested; six months of doubt and caution with estrictions of exercise and play in an atmosphere of nxiety are unlikely to stay the progress of an insidious arditis, but are well calculated to sow the seeds of a ardiac neurosis difficult or impossible to eradicate.

ROYAL LONDON OPHTHALMIC HOSPITAL.—The nnual report of this institution, which is still commonly poken of as "Moorfields Eye Hospital," although 30 ears have elapsed since it was removed to the City-road, hows that last year closed with a credit balance, after an xpenditure of £31,807. There were 2581 in-patients who tayed, on the average, 16 days and cost £6 16*s.* 8*d.* each; here were 45,000 new out-patients who cost 6*s.* 3*d.* each. onsiderable extensions are now imperative, including nlargement of the out-patients' department, accommoation for private patients, and additional nursing staff, nd extension of the medical school and laboratories.

THE RADIOGRAPHIC AND MICROSCOPIC APPEARANCE OF

INFECTION OF THE TEETH AND THE SURROUNDING TISSUES.

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THE introduction of X ray examinations has provided the clinician with an additional and very valuable eye as an aid to diagnosis and prognosis. To obtain the greatest value from such examinations the radiologist should act as one of a team. The interpretation of dental radiograms is not easy. There are so many factors causing distortion of the images—the curving of the film in the mouth and the angle of incidence of the beam of X rays on the film when it is being activated. Add to this the wide range of variations of the dental arches and palates of different individuals, and it will become obvious that only the most painstaking technique is likely to lead to satisfactory results. Here, almost more than in other branches of radiography, the slogan "Only the best is good enough" applies.

Tables, setting out the angles of incidence for the beam of X rays upon the film for the various teeth, must be inaccurate, considering the wide variations of individuals. This angle must depend also upon the tilt of the patient's head. Only by experience and practice then is it possible to produce accurate representation of the teeth and surrounding tissues upon the films. Fortunately, it is easily possible to obtain clarity of detail, for the film can be placed in very close apposition to the objects under examination and there is a minimal amount of extraneous matter to be traversed by the beam of X rays in its passage to the film. Only the interposition of the nose, in the case of the upper incisors, and of the malar bone in the case of the upper molars, materially obscures this clarity.

The production of radiograms of fine detail, then, enables minute variations from the normal or healthy to be quickly and surely recognised, and it was with the purpose of proving that the radiographic interpretation of these alterations was true that the investigations about to be described were carried out. The radiographic appearance of infected bone in osteomyelitis and tuberculous disease is established and proved. The changes which occur in the bones of the jaws when these are infected from the mouth are essentially the same, although in the vast majority of cases the process is much more chronic. Yet the fine detail of a dental radiogram renders the detection of even small localised patches of infected bone quite possible.

The alterations produced in the bone as the result of infection are three: 1. Thickening of the trabeculæ with concomitant reduction in size and shape of the intertrabecular spaces—i.e., sclerosis. 2. Rarefaction of the trabeculæ with the necessary enlargement of these spaces. 3. Destruction varying from the loss of a few of the bony trabeculæ to the production of macroscopic cavities in the bone.

Sclerosis may be regarded, generally, as a defensive reaction of the bone to the advance of the infection. Rarefaction and destruction, then, will be regarded as a comparative lack of defensive power of the bone to the advance, due either to relative weakness of the tissues or to relative strength of invasion.

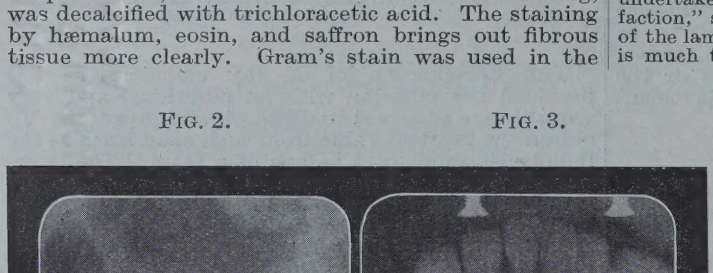
The investigations which were carried out to prove these points, although numerically weak, were valuable in that they were consistent with clinical evidence and with themselves, and they may stimulate others to carry on the experiments. There are eight cases. Small pieces of bone of the alveolar process were removed from around teeth, said to be infected

upon X ray examination, by a small trephine of about three millimetres, mounted in the handpiece of a dental engine.

The preparation of the specimens was as follows. 1. Fixation in 40 per cent. formalin in physiological salt solution. 2. Fixation and decalcification in Bouin's fluid for two to three days. 3. Embedding in paraffin. 4. Cutting and mounting. 5. Staining with (*a*) hæmalum and eosin; (*b*) hæmalum, eosin, and saffron; (*c*) Gram's stain.

Specimen 1, taken from the dried skull of a dog, was decalcified with trichloracetic acid. The staining by hæmalum, eosin, and saffron brings out fibrous tissue more clearly. Gram's stain was used in the

FIG. 2. FIG. 3.



Sclerosis around an infected cyst. The periodontal membrane is thickened and the lamina dura is absent. The trabecular network is replaced by compact sclerotic bone.

The lower incisors of a patient suffering from a "toxic" heart. The lamina dura is absent, the periodontal membrane is irregularly thickened, the trabeculæ are hazy, and tracks can be seen leading from the roots to the deeper bone.

hope of demonstrating some micro-organisms in the deep bone. No attempt was made to produce cultures, for the technique of removing the bone was not sufficiently rigorous to exclude the possibility of contamination from the tissues of the mouth. All the cases were examined by dental radiograms before removal of the piece of bone.

Description of Specimens.

1. A fragment of bone, taken from the dried skull of a dog which had been the subject of marginal osteitis. Radiographically there is extensive loss of bone about the necks of the teeth. A mild sclerosis is noted around the apices of the roots. The radiograms are unnaturally clear owing to the lack of soft tissues. The site of the removal of the bone was at some distance from the margin. Under the microscope the bone tissue appears normal, except that, having been preserved dry, the marrow tissue is shrunk. Animals rarely show symptoms of deep bone infection.

2. A fragment taken from bone surrounding an infected cyst. Radiographically the bone is densely sclerosed, and the shadow of the lamina dura is lost in this sclerosis. The trabecular shadows are hazy, and the intertrabecular spaces are rounded (Fig. 2). Microscopically the bone trabeculæ are broader than usual. They show parallel striæ, as though fresh deposits of calcium salts had been laid down. These striations resemble the formations seen in tree trunks. The osteogenetic cells are normal, so that these lines of "secondary calcification" only accentuate the normal appearance. In the marrow there is abundance of fibrous tissue infiltrated with lymphocytes. Osteoclasts are numerous at the borders of the trabeculæ. In places they lie in little "niches" in these structures.

3. A fragment taken from around the lower incisors of a patient suffering from a "toxic" infection of the heart. Radiographically the summits of the interdental septa are destroyed, and there is little reactive sclerosis. The shadows of the lamina dura are indistinguishable, and the periodontal membrane shadows are irregularly thickened. The trabecular shadows are fine and hazy, and tracks are to be seen leading from the roots downward to the deeper bone (Fig. 3). The slides show a piece of bone with the periodontal membrane and a fragment of root. The trabeculæ show some rare deposits of "secondary calcification." The bone cells appear healthy, and are of average numbers. In the marrow the blood-vessels appear dilated and contain numero polymorphonuclear leucocytes. These are situated agai the walls of the vessels, and in places have traversed the wa and are lying in the surrounding tissue. At the borders the trabeculæ the osteoclasts are numerous and in places situated in "niches," apparently eaten into the bone. T cement and dentine of the tooth do not exhibit any path logical abnormality, and staining by Gram did not rev any micro-organism.

4. A piece of bone taken from around the apex of an infect tooth. Radiographically the point of a broach, which h been passed through the apex, is seen. The trepanning w undertaken to remove this. At the apex is an area of "ra faction," surrounded by dense hazy sclerosis. The shad of the lamina dura is absent and the periodontal membra is much thickened and irregular. The fragment of ceme and dentine removed do not reveal any path logical change under the microscope. The bo is partly compact and partly cancellous. T trabeculæ do not show any "secondary calci cation"; there is some increase of fibro tissue in the marrow and also a slight gene infiltration of lymphocytes. Osteoclasts, s uated around the borders, are not numero In the periodontal membrane at the apex an abundant accumulation of lymphocyt and the limits of the bone are irregul Staining by Gram was negative.

5. A fragment of bone removed duri apicectomy. It was taken at a distance about three millimetres from the apex. Arou the apex the bone is sclerosed and hazy in t radiograms, and the intertrabecular spaces a rounded and diminished in size. There is lit microscopical alteration in the bone cells, a the trabeculæ do not show any change. T periodontal membrane also is normal. In t slide stained by Gram, although no orga isms were detected, there is a definite diffu infiltration of lymphocytes in the bone-marro The slides were prepared from different are of the specimen.

6. A fragment of bone taken from t edentulous jaw. The teeth had been moved two years previously. The trabecul shadows are thickened in places, but still haz A compact covering layer has not yet form upon the surface of the alveolar process, an indication th healing is not yet complete. The bone cells are microscop ally normal. The trabeculæ are thick, and lines of "seconda calcification" are well shown. The marrow tissue is invad by excess of fibrous tissue. In places this is arranged dense bundles. Where this tissue looks younger there augmentation of the capillaries and a generalised infiltrati of lymphocytes. At the borders of the trabeculæ the ost clasts are in excess, and are often to be seen lying in lit bays in the bone.

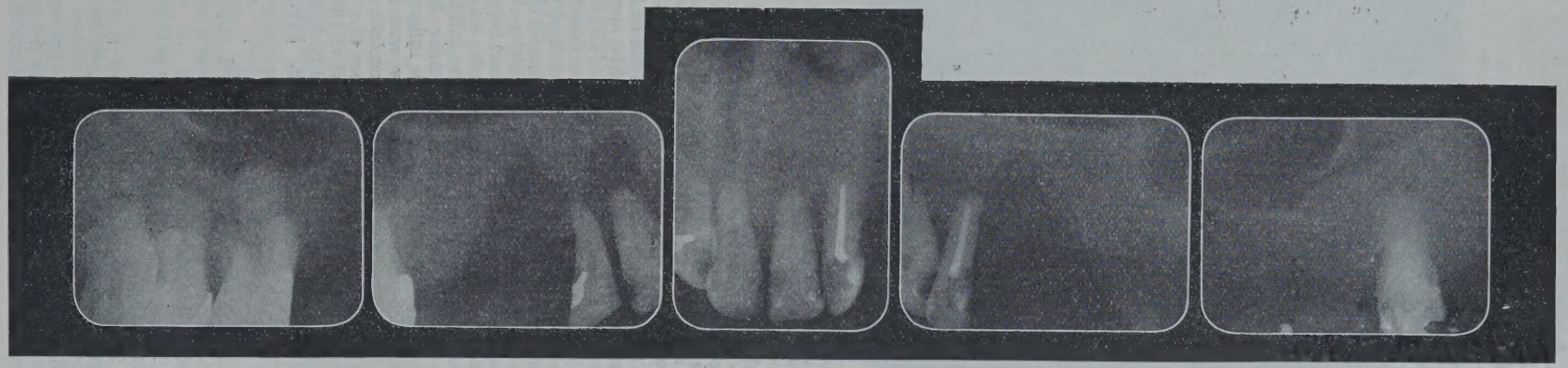
7. A fragment taken from the bone surrounding infected cyst. The trabecular shadows are hazy and t limiting margin of the cyst ill-defined. Osteoblasts numerous in the bone, in which are noted lines of "seconda calcification." In the marrow there is an increase of you fibrous tissue, and in places an infiltration of lymphocyt Staining by Gram was negative.

8. A fragment of bone taken with the tooth in extracti from a jaw the subject of osteitis deformans. In this series radiograms (Fig. 4) the contrast with those of the norm bone is very striking (Fig. 1). The bone has lost its char teristic reticulate form and has acquired an appearance b described as that of ground glass. The roots of many of t teeth are exostosed, and the shadows of the lamina dura ha disappeared. In spite of the bulbous roots, the teeth w easily removed by the dentist. The bone was soft a "springy" in consistence. Under the microscope t bone has a quite particular appearance. The trabecu are short, as if broken, and appear to have been invad by medullary spaces. Some few lines of "seconda calcification" are still noted, and in places the trabecu are invaded and replaced by fibrous tissue, well shown staining with saffron (Fig. 5.) The bone cells app normal, but in the fibrous tissue the cells are shrivelled lost. Normal marrow is completely absent and is repla by large spaces, having a rounded and irregular cy formation. The lining of these cysts is composed of fibr tissue which in some parts is placed against the be trabeculæ, while in other parts osteoclasts intervene. Wh the bone is replaced or apparently being replaced by fibr tissue osteoclasts are numerous, and are sometimes s surrounded by this fibrous tissue, in which is a n infiltration of lymphocytes. Coloration by Gram pro negative.

Some Notes on Case 8.—Aged 56, this patient came routine examination of the teeth and jaws. Up till t

Complete survey. Each tooth is shown clearly at least once. There is some destruction of the summits of the interdental septa, particularly of the posterior teeth, with accompanying sclerosis. A small area of localised hazy sclerosis is to be seen at the apex of $\underline{3}$. There is well-marked hazy sclerosis also of the bone surrounding the roots of $\underline{7}$. Elsewhere the supporting bone is fair.

FIG. 4.



Radiograms from a jaw affected by osteitis deformans. The bony tissue looks like ground glass, the lamina dura is absent, and the periodontal membrane is irregularly thickened. The contrast is striking between this bone and that shown in Fig. 1.

there was no suspicion of osteitis deformans and the only clinical sign, albeit somewhat remote, that could be elicited was that her brother had remarked that she had become "bow-legged." Examination of the limbs by X rays did not reveal any curving of the bones, but there may have been slight alteration of the shape of the necks of the femora.

FIG 5.

Microphotograph of cancellous bone. × 90. The trabeculæ are irregular and the medullary spaces have undergone a cystic transformation.

The skiagram of the skull showed a suspicious thickening of the vault, but the change was not sufficient to warrant a diagnosis upon that alone.

The slide (Fig. 5) does not show all the characteristics of bone subject to this disease, perhaps because the change is very early, and also because the bone is infected.

In Specimen 1 there were no signs of inflammation in the bone, and the radiographic appearance was brilliantly clear. In Specimens 2, 4, 5, 6, and 7 there was lymphocytic infiltration of the marrow, excess of osteoclasts, and the delicate network of the bone had become more coarse and the trabeculæ thickened and hazy. Where the bone trabeculæ had become thickened the so-called lines of secondary calcification appeared. In Specimen 3 there was an osteoporosis. The bone trabeculæ are finer. The infiltration of the bone-marrow by polymorphonuclear leucocytes is an indication of a more acute inflammation. In Specimen 8 normal bone-marrow was absent. The bone trabeculæ were short and in certain sites replaced by fibrous tissue. In this case the lymphocytic infiltration warranted the removal of the teeth. The radiographic image of the alveolar bone in this disease has an appearance quite particular. It resembles that of ground glass.

Conclusions.

1. None of the slides revealed micro-organisms. Perhaps bacteriological culture would be necessary to establish their presence.

2. The osseous lesions are those that result from inflammation.

3. The radiographic appearance corresponding to the inflammatory lesions are: (*a*) Sclerosis, when the trabeculæ present the so-called lines of secondary calcification. (*b*) A haziness of the trabecular shadows when the microscopic examination revealed the signs of inflammatio . (*c*) This inflammation is accompanied by sclerosis when the inflammation is chronic On the contrary, when the inflammation is acute sclerosis is absent.

4. The histological and radiographic examinations correspond in general with the clinical findings.

5. The particular image of the bone in the dental radiograms of the case of osteitis deformans may permit of an earlier diagnosis of this malady.

CHORDOTOMY IN THE TREATMENT OF OSTEOARTHRITIS OF THE HIP.

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OSTEOARTHRITIS, particularly when it affects the hip-joint, is one of the classical diseases of old age and it is often difficult to treat when palliative measures have failed and the patient is crippled with pain and deformity.

It is essentially a senile degeneration of the joint characterised by atrophy and eventual disappearance of the articular cartilage in the centre of the joint with hypertrophy leading to the formation of osteophytic outgrowths at the periphery. It is therefore a true arthritis *deformans*, but unfortunately this term has been used to include other conditions besides osteoarthritis. As will be seen presently, the age of the patient is not the sole factor in determining this "senile" type of degeneration, and osteoarthritis, particularly of the monarticular traumatic variety, is often seen in comparatively young subjects. But most of the patients are at least middle aged or elderly and, it may be remarked, unsuitable for drastic surgical operations upon the affected joints.

During life the joints are not passive pieces of mechanism, but living structures which react to use like other living tissues. Every functional use of a joint is in a sense an injury—that is, friction and pressure tend to wear away the opposed articular surfaces. This normal wear and tear is at once made good by the increased blood-supply and nutrition which always accompanies function in normal tissues; hence the balance between wear and repair is dependent upon an adequate vascular response to function. If for any reason the vascular response in a joint is deficient, so that the process of repair is not equal to the demands made upon it, the joint simply begins to wear out and the cartilage becomes worn away where the friction and pressure are greatest. But the products of degeneration act as irritants to living tissues, so that in addition to degeneration in the centre of the joint there is also irritation, which makes itself evident in hypertrophic changes at the periphery where the blood supply is still abundant.

Thus the characteristic features of osteoarthritis are degeneration leading to atrophy, erosion, and eventual disappearance of the cartilage in the centre of the joint, and hypertrophy leading to the formation of osteophytes at the periphery.

In old people the vascular response to function is less efficient than in the young, and often the power of repair is insufficient to make up for the normal wear and tear in a joint, so that the joint begins to wear out. Osteoarthritis is then a polyarticular affection beginning more or less simultaneously in many joints, although usually some of the larger joints, such as the hips, shoulders, or knees, are more obviously affected first. Naturally, any condition which greatly increases the wear of a joint, such as over-use, excessive weight-bearing in the case of the lower extremities, or repeated injuries, may predispose to or initiate the onset of osteoarthritis. So also any condition which enfeebles the vascular

sponse—for example, arterio-sclerosis, endarteritis, r other circulatory disorder—may do likewise.

It has already been remarked that "senile" egeneration is not necessarily confined to the aged, nd that anything which permanently interferes with ne blood-supply of a joint may bring about similar hanges at a much earlier age. Thus injury suffi-iently severe to produce lasting effects is a common ause of monarticular traumatic osteoarthritis.

Lastly, osteoarthritis may be superimposed upon ther forms of chronic joint disease, such as rheuma-oid arthritis, for precisely the same reason, and ailure to recognise this sequence has led to endless onfusion between these entirely different diseases. here is no evidence whatever that osteoarthritis roperly so-called is due to any infective or toxic gency.

Treatment.

From the very nature of the disease it is obvious hat there is no actual cure for osteoarthritis. Exacer-ations of pain and stiffness may occur from time to me and subside with or without treatment. But ne fundamental pathological changes in the joints re permanent and slowly progressive.

Treatment consists in (*a*) palliative measures for ne relief of pain and stiffness, and (*b*) surgical opera-ons also for the relief of pain, or less often for the orrection of deformity. Palliative measures, com-rising various forms of physiotherapy and hydro-herapy, all resolve themselves into different ways f producing an increase of the local blood-supply, nd their effects usually last just so long as the treat-ent continues, or a little longer. Many cases of steoarthritis have their teeth, tonsils, and appendices emoved without benefit to their arthritis, while accine therapy, founded as it is upon an erroneous onception of the disease, is equally futile.

It would seem rational to take the body-weight ff a painful hip-joint that is wearing out. But lderly patients, especially if they are fat and heavy, o not take kindly to a calliper splint, and the relief o obtained seldom compensates them for the added iscomfort.

In the earlier stages of the disease, before there re marked osteophytic outgrowths, much of the pain nd stiffness may be due to fibrous adhesions at the eriphery of the joint, and in some such cases a great nprovement may be secured for a time by forcible anipulation under an anæsthetic.

Operative Treatment.

When palliative measures have failed, and the atient is crippled with pain and deformity, operative reatment may be indicated despite the fact that any of these patients are poor subjects for surgical nterference. Practically only two operations are erformed nowadays for the relief of painful osteo-rthritis of the hip—namely, arthrodesis or destruc-on of the joint, and arthroplasty or reconstruction f the joint.

It is generally agreed that arthrodesis is the surest ay of relieving pain in the joint. As usually per-rmed, it is a very severe operation, entailing dis-rticulation of the head of the femur, the removal f the articular cartilage from both the head and the cetabulum, the replacement of the head, and pro-nged fixation of the limb in plaster afterwards. ven then it is by no means assured that bony nkylosis will follow, although the pain is usually lieved. The modification of arthrodesis described y Albee consists in removing approximately the pper one-third of the femoral head by a horizontal rt, leaving a flat surface which is then brought into ntact with a corresponding flat surface cut with a isel in the roof of the acetabulum. This operation oks very simple on paper—for example, in a flat iagram—but most surgeons have found that it is npossible to bring the two cut surfaces into contact ithout either reducing the diameter of the head of ne femur or considerably enlarging the acetabulum.

Arthroplasty or reconstruction of the hip, as it is now the fashion to call it, is an attempt to form a new joint which shall be reasonably painless and yet retain some useful movement. The classical opera-tion of J. B. Murphy has not yet fulfilled the hopes which he and others entertained for it. The operation now usually performed consists essentially in excision of more or less of the head of the femur and trans-plantation of the great trochanter to a lower level on the shaft of the bone, so as to give greater leverage to the muscles attached to it. It is by no means a trivial operation in an elderly patient, and the results as regards both the relief of pain and the preservation of useful movement are uncertain.

The operation described by Robert Jones for producing pseudarthrosis at the hip without dis-articulation of the head of the femur is seldom per-formed nowadays. It may give relief of pain, but at the cost of great instability. Excision of osteophytes from the periphery of an osteoarthritic joint (cheilo-tomy) is utterly useless; it does not relieve either pain or stiffness.

From the foregoing considerations it is clear that the accepted treatment of osteoarthritis of the hip is extremely unsatisfactory, there being no middle course between ineffective palliative treatment and drastic surgical operations for which the majority of the patients are entirely unsuited. This has induced me to approach the subject from an entirely different point of view—namely, the relief of pain regardless of its local origin.

Chordotomy.

Clinically, the dominant feature of osteoarthritis is pain. Pain drives these cases to the surgeon, and pain is almost the sole indication for drastic opera-tions, such as arthrodesis or arthroplasty in this disease. If sensibility to pain is abolished in an osteo-arthritic joint, the patient is not only relieved of his suffering immediately, but he is enabled to recover much of the mobility which hitherto has been pre-vented by pain and muscular spasm. Sensibility to pain can be completely and permanently abolished by section of the anterolateral (spinothalamic) tracts in the spinal cord at a level above the entrance of the nerve roots from the affected part. By this operation the temperature sense is also abolished, but that is a small inconvenience if the patient is warned not to burn himself accidentally afterwards. Tactile sensibility is not interfered with.

To those who are not familiar with spinal surgery it may appear that this is an operation at least as severe as those which have been considered above. But actually it is not so. The removal of at most two or three laminæ in the dorsal region of the spine can be done with hardly any hæmorrhage and with the minimum of shock, even in an elderly patient, while the section of the cord is not necessarily attended with any serious risk. As compared with operations like arthrodesis and reconstruction of the hip, chordo-tomy is far less disturbing to the patient, while the results hitherto have been remarkable.

1. Man, aged 59. Fell on left hip three years ago; was not laid up, and had no treatment except rubbing with liniment. Hip has been painful and getting progressively worse ever since. Walks with a pronounced limp. Left great trochanter somewhat raised and prominent. Flexion of left hip limited to 40 degrees; rotation and abduction absent. Constant pain. X rays show advanced osteo-arthritis of left hip. Operation, April 18th, 1929: chordo-tomy. Right spinothalamic tract divided at level of fifth dorsal vertebra. Result: complete loss of sensibility to pain up to level of left costal margin. Movements of left hip much increased and quite painless. Discharged May 18th, walking well.

2. Man, aged 40. History of contracted hips following typhoid 27 years ago. Has scar of old abscess over right great trochanter; otherwise right hip is apparently normal. Complains of gradual onset of pain and stiffness in left hip for five years. Is now in constant pain. Walks with pronounced limp. Left hip palpably enlarged; all move-ments very much restricted and painful. X rays show chronic arthritis with gross enlargement of head of left femur and acetabulum. Operation June 11th, 1929: chordotomy. Right spinothalamic tract divided at level

of fifth dorsal vertebra. Result: complete loss of sensibility to pain up to left costal margin. Left hip can be manipulated vigorously without pain. Movements much freer. Discharged July 10th, walking well.

Conclusions.

A great many people are going about in more or less constant pain and disability from osteoarthritis of the hips and other joints of the lower extremities. After spending a considerable part of their lives and fortunes in seeking relief from palliative treatment many of them seek surgical advice on account of the continued pain and disability. The forms of surgical intervention hitherto available—namely, arthrodesis and arthroplasty—are far too severe for most elderly patients, and it is usual to advise operation in such cases only when the pain is intolerable and something must be done. Chordotomy affords a means of giving immediate, complete, and permanent relief from pain in these cases without interfering with the hips or other joints.

It is not suggested that chordotomy is a trivial operation which can be lightly undertaken in all cases. But it is a much less severe operation than either arthrodesis or arthroplasty, and since it accomplishes the same object—namely, the relief of pain—more surely and with less risk, I venture to think that it may become the operation of choice in some of these cases.

Clinical and Laboratory Notes.

THE RELATION OF CAROTIN TO VITAMIN A:

BY THOMAS MOORE, D.Sc.

(From the Medical Research Council's Nutritional Laboratory, Cambridge.)

IN an earlier paper[1] in THE LANCET I supported the claim of Euler, Euler, and Hellstrom,[2] that the pigment carotin, even after many recrystallisations, possesses physiological action similar to that of vitamin A. Duliere, Morton and Drummond,[3] using a fat-free basal diet, subsequently failed to confirm this view, but further investigations by the writer[4] and by Collison, Hume, MacLean and Smith,[5] in both of which basal diets containing fat were used, furnished a weight of evidence in favour of the intense activity of the pigment, even when in the purest form obtainable.

Notwithstanding such high activity, it has been obvious to all investigators that carotin cannot possibly be identified with the familiar form of vitamin A found in cod-liver oil. To reconcile the common physiological action of substances so different, Euler and his colleagues have suggested that vitamin A activity may not be the special property of any individual molecule, but may be possessed by several molecules of the carotinoid type. The factor present in cod-liver oil, for example, may well be a carotinoid derived from marine algæ, or possibly a hydrocarotinoid. On seeking support for this hypothesis, however, Euler, Euler, and Karrer[6] have found that out of numerous substances investigated—only carotin and dihydro-α-crocetin (a polybasic acid obtained by the reduction of crocetin, a pigment of saffron) possess growth-promoting power.

The case of dihydro-α-crocetin is surprising, and its discussion may well be postponed until confirmatory evidence has been put forward. With regard to carotin and vitamin A, however, my preliminary experiments, recorded below, have indicated the possibility that the pigment may not independently exert the same action as the vitamin, but that it may act as a precursor capable of giving rise to the vitamin in vivo.

Euler, Euler, and Karrer[7] have claimed that when carotin is administered to rats above a certain level it is stored in the liver unchanged. An examinatio of the liver fats of rats which had received excess carotin has led the writer to a different conclusio Albino rats (litter mates), employed in an experiment demonstrate the absence of vitamin D in caroti were placed upon the Steenbock rachitogenic di No. 2965,[7] and were given daily graded doses of a samp of carotin (M.P. 174° in air), which had been prepare from carrots and recrystallised five times from chlor form by the methyl-alcohol method. At the co clusion of the experiment, which lasted 36 days, t livers were minced, digested with 5 per cent. caust potash, and extracted with ether. The liver fats we obtained by washing, drying, and evaporating t ethereal extracts, and were analysed for carotin ar for vitamin A by colorimetric and spectroscop methods. The data obtained are shown in the Tabl

Rat No. Maximum weight.	Daily dose of carotin (mg.).	Total colorimetric units ingested by rat.		Total colorimetric units found in liver.		Total yellow units to be expecte in live if blue chromo gen we caroti
		Blue units in $SbCl_3$ reagent at 590μμ.	Yellow units in $CHCl_3$.	Blue units in $SbCl_3$ reagent at 610-30μμ	Yellow units in $CHCl_3$.	
♀ 1 (114 g.)	Nil	Nil	Nil	100	11	1100
♂ 2 (126 g.)	0·0001	0·6	6·6	100	10	1100
♂ 3 (143 g.)	0·001	6	66	100	10	1100
♂ 4 (150 g.)	0·01	60	660	200	11	2200
♂ 5 (132 g.)	0·1	600	6,600	250	14	2750
♂ 6 (140 g.)	0·75	4500	49,500	550	45	6050

Attention may first be directed to the striking ca of rat No. 6, which received carotin at the high level 0·75 mg. daily. Although this amount of pigment, absorbed unchanged, would have been sufficient render the whole rat intensely yellow, it is noteworth that on autopsy the body fat was found to be as colou less as that of control animals. Even in the liver f only feeble yellow pigmentation was observed, but the other hand an unusually intense reaction w given with the antimony trichloride reagent. Sin the absorption band observed spectroscopical in the blue solution was situated at 610-630μ (characteristic of vitamin A) and not at 590μ (characteristic of carotin), strong evidence w afforded that a proportion of the pigment had bee transformed in vivo to vitamin A.

This possibility is supported by the other resu obtained. The colorimetric units adopted represe those amounts of material which when dissolved in cube of 1 cm. side of either chloroform or the antimo trichloride reagent would produce colorations equiv lent in depth to 1·0 Lovibond unit (yellow or bl respectively), when viewed through the cube. 1 m of carotin under these conditions contains 1800 yell or 165 blue units. It will be seen at once that in t case of Nos. 2 and 3, to which carotin was admin tered at less than the minimal physiological dosa no opportunity for storage was afforded, and the bl unit contents of the livers of these rats did not ri above the level of the negative control rat No. 1. the case of all three rats (Nos. 4, 5, and 6), whi received carotin in excess of the minimal do decidedly higher values in blue units were observe but no appreciable increases in yellow units, such must inevitably have accompanied the storage carotin, were observed. This evidence, consider in conjunction with spectroscopic data, makes it pla that the high values in blue units shown in these ca were due to vitamin A.

The above experiments indicate clearly that caro does not appear unchanged in the liver of the rat more than minute traces, even when large excess

ıe pigment is ingested. A strong temptation must xist to connect the disappearance of the pigment with ıe formation of the vitamin. This important uestion is being put to test in more extensive experi- ıents in which it is hoped that dangers due to irregu- ırities in storage, or complications arising through the ɔnservation of the rat's original store of vitamin by ıe preferential use of the added carotin, &c., may be ıled out. For the present justification must exist ɔ suspect all estimations of carotin which are based urely on data obtained by the use of the antimony ichloride reagent without the support of spectro- ɔpic data and estimations of yellow pigmentation.

Conclusion.

The ingestion of excess of carotin by the albino ıt leads to no increase of the pigment in the liver, but ɔ a great intensification of the colour reaction for itamin A.

References.

Moore, T.: THE LANCET, 1929, i., 499.
Euler, B. von, Euler, H. von, and Hellstrom, H.: Biochem. Zeit., 1928, cciii., 370.
Duliere, W. L., Morton, R. A., and Drummond, J. C.: Chem. and Ind., 1929, xlviii., 518.
Moore: Ibid., p. 631.
Collison, D. L., Hume, E. M., MacLean, I. S., and Smith, H. H.: Ibid., p. 631.
Euler, B. von, Euler, H. von, and Karrer, P.: Helv. Chim. Act., 1929, xii., 278.
Steenbock, H., and Black, A.: Jour. Biol. Chem., 1925, lxiv., 263.

CASE OF "POST-VACCINAL ENCEPHALITIS."

BY G. N. GROSE, M.R.C.S. ENG.,
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THE following is an account of a fatal case of ıcephalitis following vaccination recently admitted ɔ St. George's Hospital:—

The patient, a boy of 14, passed the medical examination ɔr the Post Office service in June of this year. He was ıccinated for the first time on July 30th; Government calf mph was used but no other person was vaccinated at the me time. Four insertions were made, three of which "took ell." His doctor examined him on August 8th and found ıe vaccination to be pursuing its normal course. The boy's ther says that on the 9th he complained of headache and as constipated. Stiff neck and pain in the chest on deep spiration followed and continued for two days. On the th the headache was much worse. He became drowsy ıd this drowsiness increased till his admission to St. George's ospital the same evening.

On admission the temperature was 103·4° F., the pulse- te 104, and the respiration-rate 30. The boy was flushed ıd the whole body surface felt hot and dry. He was very owsy and made no attempt to understand or answer ıestions. He opened his eyes from time to time, groaned intly, rolled his head from side to side, and appeared to sent examination. There was no head retraction but finite stiffness was present in the neck muscles and erector inæ. The pupils were equal in size, partly dilated, and acted briskly to light. The fundi appeared normal but e discs were slightly inflamed.

The upper limbs were held in an attitude of flexion with casional spasmodic movements and muscular twitchings. ɔth limbs were spastic and all tendon reflexes were greatly aggerated. The lower limbs were flaccid, the right more an the left. Tendon reflexes were only feebly present. antar responses on both sides were equivocal. Kernig's gn was present on both sides. The abdomen was retracted d slightly resistant. Reflexes were present. There was bladder distension and neither liver nor spleen was lpable. The heart was slightly dilated and a soft blowing stolic murmur was audible all over the præcordium. ɔthing abnormal was detected in the lungs.

Vaccination marks were present on the left upper arm d appeared to be normal; of these three had "taken" d were surrounded by some petechial hæmorrhages.

The cerebro-spinal fluid on admission was under moderate essure and clear. Dr. E. L. Hunt's report on it was as llows: "Colourless fluid; marked excess of cells in centri- galised deposit, polymorphs about 80 to 90 per cent. ɔ organisms found; globulin—no excess; albumin— cess, opaque cloud; sugar—well-marked reduction, about rmal = 0·085 per cent."

Course of the Illness.—On August 13th drowsiness had vanced to coma. Pupils were still equal and active and ere was no squint. Fine fibrillary twitchings were visible from time to time in both masseter muscles. There was complete flaccid paralysis of the right leg. In the left leg only the knee-jerk could be elicited and on attempting to obtain a plantar reflex the whole limb was drawn up slowly. The abdominal reflexes were present only in the upper right quadrant. The cremasteric reflex was absent. The bladder was distended and there was slight incontinence of urine. Urine drawn off by catheter contained nothing abnormal. The temperature rose to 106·5° F. at night and the respiration-rate to 36. There were no physical signs in the lungs. The resting blood-sugar was 0·138 per cent., and the blood-urea 0·037 per cent.

At a second lumbar puncture the fluid was found to be under less pressure than previously. Dr. R. B. Hervey Wyatt reported that it was "slightly tinted and blood-stained fluid. Sugar present in normal amount; globulin—faint haze; albumin—slight excess. Excess of cells—chiefly polymorphs; many lymphocytes also present; no organisms seen."

On August 14th the coma was deeper. The temperature fell during the day from 106° to 103°. The patient had incontinence of fæces but not of urine. There was complete flaccid paralysis of both lower limbs and the upper limbs were less spastic. Pupils were still equal and reacted to light but were smaller; there was no squint. The neck muscles and erector spinæ were less stiff. A hard, red swelling, size of a tangerine orange, appeared over the left sacro-iliac joint. Several erythematous patches were also present on other parts of the body. No hæmorrhages were seen in the buccal mucous membrane or fundi. Considerable œdema of the prepuce appeared. Respirations became slow and sighing at night.

At a third lumbar puncture the fluid was under greater pressure than on August 12th and more deeply blood-stained. Dr. Hunt reported: "Fluid contains a little macroscopic blood. After centrifuging the fluid the supernatant fluid has a distinct faint yellow colour. Centrifugalised deposit—mostly blood; the leucocytes present do not seem more numerous than would be accounted for by the blood present; the percentage of lymphocytes is rather high. No organisms found. Sugar—present, about normal; globulin—no excess; albumin—excess, opaque cloud. Urea = 0·06 per cent. No growths were obtained on any of the cultures made from the specimens of cerebro-spinal fluid.

On August 15th the boy was considerably weaker. Urine obtained by catheter contained a trace of albumin and blood. The pupils were contracted and fixed. The fourth lumbar puncture yielded only 1 c.cm. of blood-stained fluid not under pressure. A swab taken from the vaccination marks yielded no growth on culture. Blood culture was negative.

The boy grew rapidly weaker and died in the afternoon.

Post-mortem Appearances.—The body was examined 19 hours after death. Heart: some dilatation of both auricles; otherwise healthy. Lungs: a few petechial hæmorrhages under the visceral pleura on the left side and some degree of congestion at the bases of both lungs. Liver: slightly congested; otherwise healthy. Spleen: larger than normal and congested but soft. Kidneys healthy. Bladder distended with urine.

There was no flattening of the surface of the brain but all the vessels were intensely congested. On section the cut surface was at once covered with minute globules of blood oozing from the congested vessels. No hæmorrhages were apparent to the naked eye and there was no apparent increase of fluid in the ventricles. There was no meningitis. Sections of the pons, cortex, and basal ganglia are being prepared for microscopical examination.

I wish to express my thanks to Dr. C. B. Levick for permission to publish these notes, and to Dr. Hunt and Dr. Hervey Wyatt for their reports on the cerebro-spinal fluid.

A CASE OF INTUSSUSCEPTION CAUSED BY POLYPI IN A YOUNG ADULT.

BY DONALD W. STUART, M.R.C.S. ENG.,
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THE following case seems worthy of publication.

A girl, aged 15½, was admitted to the Cardiff Royal Infirmary on July 1st, 1929. On the same morning she had been seized with a sharp pain in the right side. During the course of the day she retched several times, but only vomited once; her bowels had been open on the previous day and she had never passed blood per rectum. She did not appear

obviously ill. A definite, large, tender mass was palpable in the region of the umbilicus, and appeared to be of the consistency of intestine. There were no urinary symptoms or any undue emptiness in the right iliac fossa.

At operation by Mr. Harries the same evening a large ileo-ileal intussusception was found, and was reduced with great difficulty. Soft polypoid masses were felt within the

Polypoid masses springing from the wall of the ileum.

lumen of the ileum. On opening the gut polypoid masses, like bunches of grapes, were seen springing from the wall and partially blocking the lumen; they extended along the wall for several inches, and the apex of the intussusception was opposite one of these masses. The photograph illustrates their appearance. As it was found impossible to remove the masses separately, about five inches of ileum was resected and the divided ends brought together with an end-to-end anastomosis. The patient made an uninterrupted recovery.

Microscopically, the protruding masses were shown to consist of fat lying in the muscular wall under the mucous membrane, and each had the appearance of an epiploic appendix projecting inwards.

It is quite common to get enlarged lymphoid follicles in an ileo-ileal intussusception, but very unusual to see an intussusception caused by polypoid masses.

I am indebted to Mr. D. J. Harries for permission to publish this case.

THE SURGICAL SIGNIFICANCE OF THE NERVUS SPINOSUS.

By E. Carew-Shaw, M.R.C.S. Eng.,

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The nervus spinosus is so cavalierly treated in the standard anatomical and surgical text-books that it is not generally believed to possess the slightest surgical significance, yet it is an important path of referred pain—that reaction of a nerve to an abnormal stimulus. In this case the nerve is the mandibular division of the trigeminal, the abnormal stimulus is generally pressure and the result is pain over the area of supply of the nervus spinosus accompanied by tinnitus.

Anatomically the n. spinosus arises from the trunk of the third division of the trigeminal, and leaves the skull in company with the parent trunk through the foramen ovale. In this part of its course it is closely adherent to the periosteum at the base of the skull, and so usually escapes the notice of the dissector. It then re-enters the cranial cavity by way of the foramen spinosum with the middle meningeal artery, runs beneath the dura to the petro-squamal suture, and so enters the mastoid antrum, which it supplies, also sending twigs to the additus and posterior portio of the middle ear.

Case 1.—A woman, aged 30, gave the following histor Three years ago there was pain and tenderness ov the left ear which gradually increased in severit Temperature 101° F., pulse-rate 120. Mastoiditis w diagnosed and treated by operation. The pain subside for a few days after operation, only to reappear with marke vigour, and this time the right ear was also implicated. sea voyage was tried, but there was no improvement. T patient's general condition deteriorated owing to the loss sleep caused by the otalgia and tinnitus. On examinatio both drums were in perfect condition of colour, tension, a lack of scarring. The hearing showed the normal range acuity. Behind the left ear was a well-healed masto scar. The nose, accessory sinuses, and throat were all norm and the teeth appeared to be in perfect condition. X ray examination, however, bilateral impacted wisdo teeth were clearly visible. Further X ray plates showed th the roots of the impacted teeth were encroaching on t inferior dental canal. The two wisdoms were removed, al the first molars on both sides, because they exhibited sig of pressure necrosis; this gave almost instant relief from t pain and tinnitus.

Case 2.—A nun, aged 32, had suffered from unilater otalgia and tinnitus for six months. The symptoms we insidious in onset and though becoming steadily worse nev interfered with sleep. The patient ascribed her troubles a fall. On examination, the nose, throat, and ears were fou to be quite healthy, but on the side of the painful ear impacted wisdom tooth could be made out projecting little above the gum margin. This was confirmed by rays. The tooth and the one against which it was impacted- again because of pressure necrosis—were removed. Th entirely cured all subjective symptoms.

Case 3.—A woman of 29 gave a history of bilateral otalg and tinnitus for nearly two years. Though there we occasional remissions, there were always exacerbations pain at menstruation. Examination revealed nothi abnormal in the nose, nasopharynx, fauces, mouth, or laryn Large painful glands could be palpated on either side of t neck. I regret to state that no radiographic examinatio was carried out because the patient, who was a dent student, assured me that she had had her mouth X ray recently as she was worried about the condition of tw crowned teeth, but that the plates showed nothing unusu A blood count showed a leucocytosis of 16,000 with ma immature polymorphonuclear leucocytes, but a ve thorough medical examination failed to reveal signs tuberculosis or other chronic disease. After two months t glands in the neck were no longer palpable, but the otalg became steadily worse and with fewer remissions. T patient was again examined; this time a wisdom too could just be made out erupting slightly through the gum the left side, but the X ray plates on which I now insist showed that the tooth was impacted and also that a simil condition was present on the other side. The teeth we removed and the tinnitus immediately subsided, but t otalgia took nearly five weeks to disappear completely.

These three cases are selected from eight of the kind, and they all illustrate clearly how forgetfulne of the existence of this nerve might easily cau embarrassment or worse. I should mention th each patient showed a rise of temperature to abo 100° F. with each exacerbation of pain.

Overseas Nursing Association.—The annu report of this Association comes down to March 31st la Its object is to supply trained nurses for hospital a private work in the Colonies and Dependencies, and amo other British communities abroad. Its total income w £1144, of which £718 represented fees in respect of the cc of selecting 171 nurses for Colonial Governments and certa institutions. The number of nurses employed during t year was 846, an increase of 115. For the first time a nur has been appointed for the Leper Settlement in Cypru she has charge of 98 Greeks and Turks.

Hospital for Sick Children.—Last year, t annual report records, there were 6950 in-patients who cc £6 5s. 3d. each; new out-patients (6s. 10d. each) number 28,786. The board of management is still considering t urgent problem of reconstruction. Although the site of t Foundling Hospital is available it cannot be bought f lack of means, and unless those means are supplied, it stated that the hospital will have to be rebuilt on the p sent disadvantageous site in Great Ormond-street. Sin the institution was established in 1852, more than a milli children have been treated.

BRITISH MEDICAL ASSOCIATION.

ANNUAL MEETING IN MANCHESTER.

(*Continued from p. 337.*)

SECTION OF SURGERY.

DIVERTICULITIS.

Opening Address.

WITH Prof. E. D. TELFORD, the President, in the hair, a discussion on Diverticulitis was opened by Dr. E. I. SPRIGGS (Ruthin). He began by reviewing he history of diverticulitis, and said that Graser in 898 was apparently the first to suggest that nflammation of the peritoneum about the sigmoid olon was due to diverticula. With the advent of X rays further light was shed on the condition, and arly stages of the disease detected; it appeared that here was a stage in the bowel in which diverticula ere present but not inflamed. Afterwards O. A. Iarxer detected a still earlier stage, so that three tages in the progress of the disease were now ecognised: (1) the pre-diverticula stage; (2) the tage of formed diverticula; and (3) the stage of nflamed diverticula, or diverticulitis. In the first tage the affected bowel lost its normal segmentation nd presented a more rigid outline due to pathological hanges in the bowel wall. The second stage—i.e., f formed diverticula—was often discovered by adiological examination, and in 1000 such examina- ons at Ruthin Castle it was found in 10 per cent. s regards microscopic features, the muscular wall of he bowel might or might not cover the pouch. The tiology of diverticulitis was not yet fully understood, ut the incidence in middle age pointed to the pouches eing acquired and not congenital. They might be mple pulsion pouches, but Dr. Spriggs thought the ain feature was probably that of inflammation, for ey were found associated with infective foci in ther parts of the body. Constipation, he said, was robably not the cause, for the disease was commoner men than in women, and there was no abnormal onstipation in the series. Aperients were more likely be harmful, by producing liquid fæces which by acterial or chemical action damaged the bowel wall.

The clinical features might be classified as follows:) discomfort round the navel, or more especially the left iliac fossa; (2) flatulence and a feeling of istension, often with constipation, irregularity of the owels, diarrhœa, or a sense of incomplete evacuation. hese symptoms might have intermissions of several eeks or longer. In some cases the bladder was nplicated, with painful and frequent micturition. sausage-shaped tumour was sometimes felt in the ft iliac fossa. Rectal hæmorrhage was rare. The athological features were those of chronic inflamma- on of the pelvic colon arising from one or more iverticula and spreading to the peritoneal coat. ater on abscesses might form in the inflamed area, nd, in time, chronic inflammation might lead to a irrhous narrowing of the bowel wall.

The main points in the diagnosis were the long istory and the well-being of the patient in the interval the symptoms. The absence of bleeding and ucus was against malignant disease, although oth might occur in diverticulitis. Radiographic xamination was the most positive aid to diagnosis, ut it was a mistake to diagnose diverticulitis on the ound that some diverticula were seen, or to miss e condition because the affected piece of bowel was ot thrown into profile. When there was a narrowing ithout the characteristic appearance of diverticu- is, the presence of near-by diverticula made it obable that the case was one of diverticulitis, ough the possibility of cancer being also present was ot excluded. Obstruction might develop in diver- culitis either from inflamed mucosal folds, this rm of obstruction rapidly yielding to douching and arm oil enemas, or from fibrous constriction of the bowel wall. Douching might give relief in this as in the former.

The treatment of diverticulosis consisted in keeping the alimentary canal as clean as possible; any source of sepsis must be removed. Diet should be simple and regular with a good deal of fruit and vegetables and little meat. Dr. Spriggs used a freshly treated culture of *Bacillus acidophilus* in sterile milk. Paraffin was also given to ensure that the motions were soft. He did not believe in aperients except in special cases. The colon was to be washed out with normal saline solution every other day for a time; in some cases it was necessary to do this permanently. The above regulations, with a sufficiency of exercise and rest, together with abstinence from alcohol, was all that was necessary as a rule. Often by such treatment the disease could be arrested, or its progress at least greatly retarded, the pouches emptying their contents more rapidly after treatment. Operation might be needed for an accident such as the perforation of a pouch, also for complications such as an abscess or a fistula, and in some cases where obstruction had supervened. In a number of cases the disease was much localised, and some of them were favourable for excision.

Dr. Spriggs concluded his paper by saying that diverticulosis was a complaint that could be controlled if recognised early, but became dangerous if allowed to take its course unchecked. It was necessary, therefore, to be familiar with the early stages.

Dr. Mayo's Views.

Dr. WILLIAM J. MAYO (Rochester, U.S.A.) ascribed the first account of diverticulitis to Habershon in 1857. There were, Dr. Mayo said, two types of diverticula of the colon, the acquired and the true. In the former the mucous membrane of the intestine pouched through small openings at weak points of the bowel wall. This type was concerned in diverticulosis, in contra-distinction to true diverticula of the congenital type, in which all the intestinal coats covered the sac. Records at the Mayo Clinic, compiled from both radiographic and post-mortem evidence, suggested that more than 5 per cent. of persons over forty years of age had diverticulosis. A study of the relative incidence of diverticulosis in men and women showed 64 per cent. males and 36 per cent. females. As constipation was more common in women these figures seemed to show that this was not an important factor in causation. With rare exceptions diverticulitis was confined to the sigmoid. Cases might be classified into four groups: (1) Self-limiting diverticulitis in which there might be the formation of a tumour which disappeared in the course of a few weeks. (2) Diverticulitis and peridiverticulitis with abscess formation resulting in various fistulæ. (3) Diverticulitis complicated by an obstruction of the bowel. In acute cases this was due to infection and œdema, in chronic cases to hyperplasia and adhesions. (4) Carcinoma developing on a diverticulum. In such cases carcimona might develop as a result of infection and irritation in diverticula, and this last group might comprise those cases in which colostomy had been performed many years previously, the patient eventually dying of carcinoma. The distinction between diverticulosis and carcinoma of the sigmoid could usually be demonstrated by radiological methods.

In acute cases, said Dr. Mayo, surgical treatment should usually be tentative; he had operated in 26·2 per cent. of diverticulitis cases. If there was abscess formation the pus should be evacuated and if more radical treatment appeared to be necessary it could be postponed. If acute obstruction resulted, colostomy should be performed, and at a subsequent operation the stenosed portion of the sigmoid and the colostomy opening might be excised simultaneously or cæcostomy might be done instead, with radical operation later if necessary. In other cases colostomy might be resorted to for temporary relief, the opening being closed later if the lumen of the colon spontaneously became patent. Other operative procedures were for the cure of fistulæ.

Discussing the origin of acquired diverticula, Dr. Mayo pointed out that the sigmoid colon, being of relatively recent development, had not achieved the stability of the primitive small intestine. It would be interesting to know whether diverticulitis was as common in the rice- and fish-eating countries as in potato- and red meat-eating countries, the latter articles of food tending to produce a large fæcal mass and a large amount of bacterial action. There was also a possibility that spasticity of the colon predisposed to the development of diverticulitis, whilst there might be sympathetic nerve derangement due to decreased sympathetic control of the bowel.

Medical and Surgical Treatment.

Prof. W. H. MAXWELL TELLING (Leeds) said he had published an account of his first case in 1908, and resummarised the known facts in 1917. He had originally made two mistakes: first, when he failed to invent the word diverticulosis to differentiate symptomless cases; and, secondly, when he said that the treatment of the condition could be summarised in the word surgery. He now believed in treating the case medically as long as possible unless there were complications, and he thought the prognosis not too gloomy. For treatment he recommended: (1) administration of liquid paraffin to keep the fæcal mass soft; (2) weekly lavage of the bowel by saline purges; (3) an ordinary diet, eliminating as far as possible indigestible things such as nuts, and also, preferably, potatoes; (4) the avoidance of any strenuous abdominal exercises so as to reduce the risk of perforation; and (5) the postponement of surgical intervention until absolutely necessary.

Mr. J. P. LOCKHART-MUMMERY (London) disagreed with the statement of Dr. Spriggs that diverticula were formed as a result of pre-existing inflammation; he believed that the formation of diverticula was the first stage and that the inflammatory condition was secondary to their formation. Probably diverticula started as pulsion-herniæ of the mucous membrane of the colon, and secondary inflammation might take place at almost any stage in their development. Predisposing to their development, it seemed probable that there was degeneration of the bowel wall from age and unnatural conditions of bowel function. He distinguished two different types of diverticulitis: (1) a type in which the colon wall became inflamed over a wide area at an early stage of the pouches, this being the type in which obstruction occurred and could only be treated by resection of the damaged gut or colostomy; (2) a type in which the diverticula developed without the accompanying inflammation, such cases being rightly called diverticulosis. Inflammation might eventually occur in one or more of the diverticula and might result in abscess formation or peritonitis.

Diverticulitis was a disease of the wealthy classes. The diagnosis depended ultimately on radiography or discovery during laparotomy. The disease could, however, be diagnosed with considerable accuracy through the clinical picture, the chief symptoms being pain and tenderness of the left iliac fossa with slight rise of temperature. In women the affected portion of the colon might cause symptoms suggesting disease of the left Fallopian tube, and in men vesical symptoms. The early stages of diverticulitis could be successfully treated medically, and diverticulosis was a condition calling for no surgical interference; but once the inflammatory mischief was well established the condition was progressive, and although the condition might be kept in check for a considerable period serious results might occur quite suddenly. The best results of surgery were seen when the diseased area was confined to a short length of bowel and resection was performed. In many cases resection was impossible and colostomy the only procedure available. Colostomy was necessary when an abscess is perforated, either externally or into the bladder. In some cases the patient might be saved a colostomy by freeing the bladder and wrapping it carefully in omentum. Those cases in which septic sinuses had formed were very difficult to treat even when f drainage was established.

Mr. LOCKHART-MUMMERY concluded by saying th he thought the association between diverticul and carcinoma of the colon was probably acciden in most cases, though possibly, through the press in the colon, a carcinomatous stricture might lead the formation of diverticula.

Mr. SEYMOUR BARLING (Birmingham) said th to the surgeon, diverticulitis most often present itself as a local abscess, peritonitis, or intesti obstruction, and treatment must be prompt a simple. Later on the problem of the underly disease could be considered. It must be borne mind, first, that the disease lay dormant, or progr was very slow and could be checked by suita medical treatment; and, secondly, that the techni difficulties might make operation formidable. Nev theless, in selected cases resection could be undertak From a chance observation of a case during a lap otomy he had noted that there was a stage at wh the bowel wall was inflamed and irritable, when spa could easily arise and cause the mucosa to protruc and these two factors of inflammation and spa appeared to be the essential underlying cause of t fully developed condition. He had never met w carcinoma developing on diverticulitis, but in two his cases he had seen a stalked papillomatous grow associated with diverticulitis, and he did not rega the association as wholly a coincidence.

Mr. GARNETT WRIGHT (Manchester) called attenti to emergencies such as free perforation into t peritoneum and fistulæ between colon and bladder d to inflammation in a single diverticulum. He ga a short account of a case he had operated on for ac intestinal obstruction, a colostomy being perform which was later closed because the inflammat trouble in the colon had subsided, leaving a pat bowel.

Prof. D. P. D. WILKIE (Edinburgh) thought tha distinction should be drawn between diverticulosis a diverticulitis, the former being relatively common a unassociated with symptoms of ill-health. Surge might be consulted for: (1) Development of ac symptoms which generally subsided without operati Occasionally immediate operation was necessary diffuse or localised suppurative peritonitis showing t a perforation had occurred. (2) Intestinal obstr tion for which a colostomy might be required. (3) group in which the main features were a chro toxæmia and in which coincident cholecystitis v often found, and probably represented a second infection. In these cases, owing to the poor operat risk, expectant lines of treatment were indicat In a few cases resection was desirable. It should done only after preliminary colostomy to allow subsidence of inflammatory mischief; the bowel sho then be resected with the colostomy.

Mr. T. P. KILNER showed a series of slides ill trating reconstructive surgery. First series shov methods of Thiersch grafting with pressure.

SECTION OF DISEASES OF CHILDREN.

CHRONIC DYSPEPSIA IN CHILDREN OF SCHOOL A

With Dr. E. A. SAUNDERS in the chair, a discuss on this subject was introduced by Prof. F. LANGMEAD (London), who said that the term chro dyspepsia in children was used to connote a group symptoms varying in degree and in proportion, wh together formed a common clinical picture. T picture presented was that of a dull and listless ch with a poor appetite and a coated tongue. Th might be vague abdominal pains; the general nu tion was impaired and the stools irregular. Sli nocturnal fever, disturbed sleep, and psychical syr toms might also be present. In comparison w adult dyspepsia the difference lay chiefly in relative infrequency of organic lesions in childr It was doubtful if it was justifiable to regard so-called intestinal dyspepsia of children as a disor apart from dyspepsia in adults.

Ætiology of Intestinal Dyspepsia.

Analysis of the symptoms showed that they fell ıto three groups—abdominal, constitutional, and sychical. The whole position of toxæmia—arising ı that home of lost causes, the intestinal tract—was ıorny and contentious; but neither toxæmia nor cidosis needed to be invoked to explain defective utrition in a child with chronic digestive disorder.

(1) *Dietetic Causes.*—Food, said Dr. Langmead, layed an important part. Some cases were associated ith continued overfeeding; others with meals so freuent or irregular that appetite was absent. A child ould always take its food if there was appetite, and ıere was no surer way to court dyspepsia than to at when it was absent. Other common errors were iving cod-liver oil, &c., before meals, giving food at r near bed-time, food-bolting, and a diet containing xcess of "roughage." Too much stress should not e laid upon the ætiological significance of any ndigested particles found in the fæces. The relative xcess of one of the elementary food factors was apt ɔ be less considered in children of school age than in ıfants, but there was no doubt that faults in dieting ere often committed along these lines. This was ɔecially noticeable in the case of fat dyspepsia. he fermentation which arose from carbohydrate xcess often led to the passage of frequent mucusontaining stools. There was also a group of cases hich arose from protein sensitisation, producing ausea and vomiting very soon after the taking of ɔod. Inquiry in such cases might elicit that the omiting was always after a particular article of ɔod—e.g., fish, eggs, apples,—and their omission ould bring the attacks of vomiting to an end. The art played by vitamin deficiency in children of chool age was doubtful. A cause which should lways be considered was defective mastication.

(2) *The Rôle of Infection.*—To correlate the symɔms and course of the digestive disorder with the ıfection was not possible; nor could it be claimed ith certainty that the departure from the usual ıtestinal flora was primary and provocative and not ıerely secondary and incidental. The production of ıe toxæmia was a difficult question and one worthy f discussion. It had often been shown that indiıanuria was no guide to intestinal putrefaction, and robably stasis and putrefaction were not sources of ıtoxication so long as the mucosa was healthy. ocal sepsis, teeth, tonsils, adenoids, &c., did appear ɔ play an influential part in some instances, but ıronic appendicitis was probably not an important ıuse in many children.

(3) *Hepatic Dyspepsia.*—The cases which Dr. angmead had been accustomed to call "hepatic" ere those in which fats were badly borne, in which ıere were from time to time bouts of toxæmia, with ıle greasy stools, slight jaundice, and sometimes a ılpable liver. Defective functioning of the liver ıight, however, be a factor in many of the cases and ıight be related to toxic symptoms. The use of bileılts certainly increased the power of these children ɔ deal with fats. The changes found in the liver in ıtal cases of cyclical vomiting seemed definitely to ıculpate this viscus.

(4) *The Rôle of the Nervous System.*—Here the ıestion that arose was whether the nervous sympɔms were the result or the cause of the intestinal ɔmptoms, or whether both were due to some ante-ɛdent cause. Dr. Langmead's view was that in ıost cases the nervous symptoms were secondary ɔ the intestinal disorder.

In conclusion, he suggested that there was no ındamental difference between intestinal dyspepsia children and many examples of dyspepsia in adults, ıd no reason for regarding it as a disease apart, with ı individual ætiology.

Discussion.

Dr. HAZEL CHODAK GREGORY (London) was of ɔinion that the theory that the greater part of ıildish dyspepsia was due to hyperchlorhydria was ıised on a fallacy. With regard to the appendix it was doubtful if any inflammation or other abnormality of it was a common cause of intestinal indigestion. Among the organic lesions causing symptoms of dyspepsia tuberculous infection of the mesenteric glands was fairly common during school life, though the symptoms were by no means clearly defined. The present tendency to diagnose every case of dyspepsia in which there appeared to be a difficulty with fats, as one of acidosis was being overdone. A fat-free diet might suit for a week or so, but was quite inadequate for ordinary requirements. The common types of dyspepsia in childhood Dr. Gregory considered to be functional; they were sometimes hepatic, sometimes pancreatic, and sometimes enteric, but the system chiefly involved was the nervous system.

Mr. HERBERT RAYNER (Manchester) said that surgeons only saw those cases due to some tangible organic disease and these formed a very small class. The common organic lesions encountered in childhood were appendicitis, tuberculous mesenteric or retroperitoneal glands, tuberculous peritonitis, and a motley collection such as chronic intussusception, tuberculous ulcers of ileum, and Meckel's diverticulum. Gastric and duodenal ulcers were very rare indeed. Appendicitis as a cause of dyspepsia should not be overlooked, though as a rule the symptoms differed in many respects from those encountered in the adult. Three types of appendicitis could be recognised in childhood: (1) Cases with no previous history of any abdominal disorder. (2) Cases with a history of recurrent attacks of pain in the stomach over several years, but not recognisable as attacks of acute appendicitis; this was the commonest type. (3) Cases where the history indicated that the child had had mild attacks of appendicitis lasting from two to four days and recovering without operation. Tuberculous glands, said Mr. Rayner, were not so important from a surgical point of view, but there were some cases which it was impossible to distinguish from acute appendicitis.

Mr. T. S. IRWIN (Belfast) confined his remarks to the dyspepsia associated with duodenal ulcer, and gave details of four cases that had occurred in his own practice. His conclusions were (1) that duodenal ulcer did occur occasionally at school age; (2) that symptoms of a similar nature going back to school age were to be found in adults suffering from ulcer; (3) that even during school age some cases of actual perforation had been found; and (4) that vomiting was a much more frequent symptom in children than in adults.

Prof. C. W. VINING (Leeds) thought many dyspeptic symptoms were due to dietetic deficiencies. Protein deficiency and vitamin deficiency probably occurred in a large number of children. Good feeding and a generous diet were important prophylactic agents.

Dr. CATHERINE CHISHOLM (Manchester) had found that in over 3500 girls attending a secondary school in only 4·5 per cent. were gastro-intestinal symptoms present of sufficient severity to cause absence from school. It did not appear, therefore, that school stress, &c., played any part in the production of dyspepsia in children of school age, but defective hygiene was undoubtedly very important.

SECTION OF OPHTHALMOLOGY.

FOCAL SEPSIS AND DISEASES OF THE EYE.

Mr. J. GRAY CLEGG (Manchester) the President, opened the proceedings by brief reference to some former ophthalmic surgeons of Manchester: Benjamin Gibson, one of the most famous oculists of his day, who published in 1811 his treatise on the formation of an artificial pupil; David Little, a most skilful operator; Mules, whose name was associated with his operation for evisceration; and Hill Griffith, the first to recognise cellular deposit on the back of the cornea in choroiditis.

Mr. A. F. MACCALLAN (London) opened a discussion on toxic absorption due to focal septic lesions, and its effects in the production of eye diseases. He

claimed that British ophthalmology was leading in the study of this subject, and acknowledged his indebtedness especially to the work of Mr. William Lang. The more usual sites of such focal sepsis were the mouth in adults and the tonsils in children. Less common sites were the appendix, colon, or duodenum, the gall-bladder, the female pelvic organs, and the deep urethra and vesiculæ seminales in the male. Any chronic focus of sepsis might set up ocular change—e.g., a septic focus in an old amputation stump. He disagreed entirely with the view expressed elsewhere, that dental sepsis did not cause ocular disease. In a suspected case it was important to obtain really good radiograms of the whole mouth. Edentulous areas should be radiographed, for buried stumps, or unerupted teeth might be found. The frequency of apical abscess was not yet realised by the medical profession. Pain might be absent, and the radiogram might furnish the only evidence. Pyorrhœa was, in his experience, a less common cause of ocular disease than apical abscess. Tartar on the teeth might also provide the focus of absorption. Crowned teeth were specially subject to the formation of apical abscesses. The resistance factor was extremely important; many people with septic foci had good powers of resistance, and so escaped ocular manifestations. The eye might be infected by three paths: (1) direct extension, from open dental sepsis, tonsils, nasal mucous membrane, or accessory nasal sinuses; (2) lymphatic absorption; (3) deglutition and absorption from the alimentary canal. Among the results of direct extension were blepharitis, acute and chronic tarsal cysts, some forms of conjunctivitis, phlyctenular conjunctivitis, episcleritis, corneal ulcer, dacryocystitis, and orbital cellulitis. Meibomian cysts were, in his experience, almost invariably associated with dental sepsis, in private as well as in hospital patients. Phlyctenular conjunctivitis in children was usually associated with enlarged tonsils. The treatment of ulceration of the cornea had been immensely improved in his hospital clinics since the recognition of the frequency of associated causative focal sepsis; almost every case showed the obvious presence of open dental sepsis, from which there was a constant flow of pyogenic organisms to the conjunctival sac. In acute ulceration of the cornea dental treatment must be prompt and adequate, within 24 hours, if it was to be effective.

Dendritic ulcer, in Mr. MacCallan's opinion, was peculiarly apt to be associated with dental sepsis. Dacryocystitis was, he believed, often caused by it, and required surgical intervention—since removal of the dental septic focus alone would not suffice. In these conditions, toxic absorption by the lymphatics was more commonly the cause than direct extension. Iritis, on the other hand, might result from either open or closed dental sepsis, or from tonsillitis or other forms of focal sepsis. Cyclitis, with or without iritis, usually had a similar origin. Early discovery and elimination of the septic focus was of great importance. More than one septic focus might be present. Hyperæmia of the retina at the macula, without other fundus changes, was very often present when toxic products had got into the circulation; degeneration followed if the toxæmia persisted. Vitreous opacities were always accompanied by long-standing focal sepsis. Cataract had been produced experimentally by certain toxic conditions; toxins in the blood might so affect the ciliary body as to cause alteration in the aqueous, leading in turn to damage to the epithelium of the lens capsule, allowing the entrance of substances causing cataract. He believed that long-continued focal sepsis (usually dental) was the most important cause of cataract. It was therefore of great importance to detect early slight opacities in the periphery of the lens, and search for the focus of septic absorption, and to eliminate the cause of the cataract. Progressive myopia in children was, in his experience, always associated with enlarged and septic tonsils, and primary glaucoma he had found in numerous cases to be associated with a fulminating focus of sepsis. Lastly, the effect of focal sepsis on intraocular operations was very marked—a fact which should be remembered not only as regards adults undergoing operation for cataract or glaucoma, but also in children with septic tonsils who required operation for lamellar cataract, &c. In conclusion, the speaker said that though he had not dealt with the subject exhaustively, the opinions he had expressed were based on personal experience.

Discussion.

Dr. A. F. HURST (London) laid stress on the need for a definite system of investigation, for which team work was necessary. He thought the term "stomatologist" more accurate than "dentist." It should be remembered that probably every dead tooth was a source of infection. It seemed absurd to send edentulous cases to a dentist; but it had been found in a number of such cases that there were areas of rarefying osteitis. It was essential to have really good radiograms of the sinuses, and then expert examination by a rhinologist, for an antrum might be full of pus without any localising symptoms. He had never found ocular infections in association with duodenal ulcer. In connexion with achlorhydria it should be remembered that hydrochloric acid had not only a digestive function, but was also an important antiseptic. In its absence one would expect to find increased sepsis in the intestine. Bacteriological examination of the fæces was helpful if some definitely pathogenic organism was found—e.g., of dysentery—which ought not to be there. Leucorrhœa was of far more importance in this connexion than the average gynæcologist realised. When due to cervicitis it might be of great significance. It was important to realise that the cervix could be sterilised by diathermy. He had seen cases of arthritis cured by diathermy to the cervix—rather than to the joints. It was very useful and a great safeguard in some cases to have a vaccine prepared from the source of infection—e.g., in the mouth—and give some dose of this before offending teeth were extracted.

Mr. E. MUSGRAVE WOODMAN (Birmingham) referred especially to the sphenoidal and ethmoidal sinuses as possible sources of septic absorption, and called attention to the close proximity of the optic nerve. X rays showed very little of the condition of these sinuses. Methods of investigation at present available were inadequate. These sinuses lay in the position of greatest danger not only to the eye, but to the body. He submitted that there was still a case for further investigation into this area. The technique devised by Dr. P. Watson-Williams was accurate for the sphenoidal sinus, but not so satisfactory for the investigation of the ethmoidal cells.

Dr. ARNOLD RENSHAW (Manchester) brought forward figures embodying the results of examination of 1269 cases of infective eye disease in the pathological department of the Manchester Royal Eye Hospital. Of these, 682 were syphilitic and 587 non-syphilitic. In 170 of these cases elaborate systematic examination had been made including the Wasserman reaction, the Pirquet test (human and bovine), temperature reactions after injection of tuberculin, renal efficiency, glucose tolerance, and estimates of blood calcium. Of these 170 cases, syphilis was found in 41, tuberculosis in 47, tuberculosis with complications in 55, and other causes of infection in 20. Further analysis of the sources of infection (other than tubercle and syphilis) gave the following results: nose 44 cases, tonsils 38, teeth 24, ears 3, urine 6, cervix uteri 6, fæces 2, urethra (male) 2. In his experience, cases of tuberculosis affecting the eye did fairly well if treated with the proper tuberculin. Many of the cases were due to the bovine strain. Incorrect dosage might aggravate such cases. In people with oral infection teeth should never be removed till a vaccine had been prepared.

Mr. E. E. MADDOX (Bournemouth) pointed out that dental sepsis, present in a patient with ocular disease, was not necessarily the causative factor. He

referred to the interesting analogy in the structure of teeth and eyes—the enamel corresponding to the lens, the dentine to the sclera. Dental sepsis should not be regarded as a special entity; it was only a local expression of a general condition. Even a detached retina might sometimes be absolutely cured by the removal of septic teeth. He had had such a case in a young woman of 18 with double detachment of the retina. He attached importance to the least sign of rocking of a tooth when examining for suspicious teeth. Nearly all cataracts were due to focal sepsis somewhere

Mr. E. J. PRIMROSE (Glasgow) supported the views advocated by the opener of the discussion. He had had special experience of syphilitic diseases of the eye. In these cases antisyphilitic treatment was not all that was necessary. Other conditions often called for treatment at the same time—possibly some factor that had caused a latent syphilitic infection to become active or was hindering recovery. Or there might be a hypothyroid condition present, and recovery would be delayed till this was remedied.

Mr. W. B. INGLIS POLLOCK (Glasgow) urged the importance of examining the teeth before operation for glaucoma or cataract. He had seen three cases in which impacted unerupted teeth had been the cause of ocular trouble. It was advisable to remove a blind eye that might be a possible source of septic infection of the other eye. In private practice the expense of such elaborate investigations as had been described was a difficulty.

Dr. PATRICK WATSON-WILLIAMS (Bristol) said that in this matter ophthalmology was in advance of other sections of the profession. Only by all-round survey could one get to the bottom of these cases. He had suggested formerly the analogy between detachment of the retina and an infective pleurisy. He wished to emphasise the important factor of tissue defence. Defence failed at times owing to constant reinfection.

Mr. A. W. ORMOND (London) said that bacterial infection acted by chemical means; colloid chemistry was still in its infancy. Mr. Maddox's case of detached retina had interested him particularly. He had a similar case, in which cervicitis seemed to be the probable source of septic absorption. Dendritic ulcer had not seemed, in his experience, to be due to dental sepsis.

Mr. H. L. G. LEASK (Glasgow) referred to the fact that some rhinologists were more conservative than others. In his experience the ophthalmologist got more valuable help from those of the more daring temper.

Mr. T. AUBREY JONES (Stoke) called attention to McDonagh's work. He had had some very interesting results from using his treatment.

Mr. T. C. GRAVES (Birmingham) also referred to non-specific protein therapy—by T.A.B. vaccine. For example, where some chronic headache remained after a sinus affection this treatment stirred up an acute reaction, and the chronic headache disappeared.

Mr. N. BISHOP HARMAN (London) called attention to the curious fact that 75 per cent. of the phlyctenular lesions in children were located in the lower outer quadrant of the eye. In intractable cases of phlyctenular lesions it was remarkable how often removal of the tonsils effected a cure. In regard to detached retina, his experience confirmed the view that in some cases it was associated with dental sepsis.

Mr. MACCALLAN, in replying to the discussion, said, in regard to dendritic ulcer, there had, in his experience, recently been some focus of sepsis in all cases. In the removal of septic teeth caution was called for. Removal of a number of such teeth at one sitting sometimes had a bad effect. Such patients should be treated as cases of major operations were, they should have a general anæsthetic and go to bed for ten days. By this method untoward results could be avoided. As to vaccine treatment, he was not quite in agreement with Dr. Hurst. In cases of retinal thrombosis, he regarded vaccine treatment as likely to be specially dangerous. In cases of detached retina he now always looked for a focus of sepsis, and rarely used operative treatment for the detachment; the ætiology was probably similar to that of infective pleurisy. In ascertaining the presence of any dead teeth, the electrical testing of their vitality by the dentist was perhaps of more importance than a good radiogram. Before operating for cataract he would always remove a blind shrunken eyeball if present. He quite agreed with Mr. Primrose that it was important in syphilitic cases to look for other foci of sepsis.

SECTION OF OBSTETRICS AND GYNÆCOLOGY.

PLACENTA PRÆVIA.

AT a meeting of this Section, with Dr. C. E. DOUGLAS in the chair, a paper on

The Symptoms and Diagnosis of Placenta Prævia

was read by Dr. BETHEL SOLOMONS (Dublin). The terms "unavoidable hæmorrhage" and "placenta prævia" were used, he said, only when bleeding in the last three months of pregnancy was caused by the separation of a placenta situated either wholly or in part in the lower uterine segment. When speaking of the varieties of location he referred to placenta prævia as (1) central or total; (2) partial, where internal os was partially covered; and (3) lateral, where the edge could be felt just above the internal os in the lower segment. Use of the term "marginal" should be discontinued. As regards ætiology, he thought there must be some fault in the endometrium. He had several times curetted the uterus two months after the occurrence of placenta prævia, and had found evidence of either a true endometritis or else a hyperplastic condition of the uterine mucosa; he suggested that curettage was indicated two months after delivery in order to avoid a similar complication in future pregnancies. The dangers of placenta prævia, as shown by world statistics, were great for the mother and very great for the child. The mother might die from collapse following hæmorrhage, whilst sepsis might later develop owing to the low position of the placenta and the exsanguinated condition of the patient. Menorrhagia, the tendency to abort, and sterility were also sequelæ to be borne in mind. The records of the Rotunda Hospital showed 326 cases of placenta prævia with 19 deaths among 60,130 delivered; with improved technique in diagnosis and treatment Dr. Solomons was able to report a series of 55 cases without a death. Most of the babies were premature and only 12 were born alive. Placenta prævia should be suspected in pregnancy by the history of hæmorrhages at various times from the fourth month onwards. The first symptom to which attention was drawn was fresh hæmorrhage accompanied by clots. A very important point in diagnosis was that the bleeding was extremely insidious in its onset. There was no concomitant pain. Two pints of submammary saline should be given immediately after the hæmorrhage, and every practitioner should carry the apparatus and material for doing this. At the Rotunda Hospital the stock saline solution was made by boiling two teaspoonfuls of salt in a pint of water; when the solution was to be used one pint of boiling water was added. This gave the correct strength, and approximately the correct temperature (100° F.). After injecting fluid the abdomen should be examined. The uterus would be found soft and painless, with the presenting part high up and unfixed, and a uterine souffle would be heard in the hypogastrium. A vaginal examination should always be made and carried out with elaborate asepsis. The cervix would be found closed, and there would be bogginess in one or all of the fornices. If the os was open the placenta itself would be felt. The urine should be examined in all cases and would probably be found normal. In conclusion, Dr. Solomons pointed out that the prognosis depended on diagnostic ability and choice of therapeutic technique.

Treatment.

Dr. F. H. LACEY (Manchester) said that in face of a history of slight hæmorrhage at the sixth or seventh month, followed by perhaps another within several weeks, it was often hard to decide whether to temporise in the hope that the child might have a favourable chance. Since the child in these cases was usually born prematurely even when there had been no intervention, and the proportion of stillbirths was very high, the treatment adopted should be that which gave the best maternal results. If there was a history of severe hæmorrhage or of recurring slight hæmorrhages the uterus should be evacuated when the mother was in good condition. At St. Mary's Hospitals, Manchester, during the last ten years there had been 562 cases, of which 19·2 per cent. were primiparæ; the multiparæ had had an average of 4·9 children. The methods of treatment adopted were: (1) rupture of membranes in 125 cases, with a maternal mortality of 2·3 per cent. and 45 per cent. of stillbirths; (2) delivery by natural forces in 76 cases, with a maternal mortality of 2·6 per cent. and 30 per cent. of stillbirths; (3) version in 273 cases, with a maternal mortality of 7·6 per cent. and 81 per cent. of stillbirths; (4) breech delivery in 21 cases, with no maternal deaths; (5) Cæsarean section in 33 cases; (6) induction of labour in 15 cases, with no maternal deaths and 70 per cent. of stillbirths; (7) application of vulsellum forceps with weight (Willett's method modified) in 11 cases, with no maternal deaths and 27 per cent. of stillbirths. Dr. Lacey pleaded for more frequent Cæsarean section for placenta prævia at or near full term when the os was closed with a centrally placed placenta in an elderly primipara. In conclusion, he pointed out that of the 562 cases 28 had ended fatally. Fifteen per cent. had been treated at home for hæmorrhage and were very weak when admitted to hospital; this showed how important it was that every woman suffering from hæmorrhage during pregnancy, however slight, should be admitted immediately to a nursing home or hospital where she could be under constant supervision.

Discussion.

Prof. G. E. ESSEN-MOLLER (Lund, Sweden) was called upon to open the general discussion. He said that in placenta prævia the ratio of risk to the child was considerably greater than that for the mother, and he thought that in treatment maternal benefit should be aimed at. He agreed with the plea for the increased use and adoption of Cæsarean section for this condition.

Dr. J. W. RIDDEL (Plymouth) did not see why a simple issue should be complicated. Version gave the worst results and Cæsarean section was the operation of choice near full term.

Mr. L. C. RIVETT (London) agreed with the nomenclature of Dr. Solomons, and thought that the term "marginal placenta prævia" should be dropped. Discussing the differential diagnosis, Mr. Rivett pointed out that with accidental hæmorrhage the bleeding was continuous, whilst in placenta prævia there were repeated "shows" with periods of no bleeding in between. He thought that most cases delivered themselves with the aid of some simple procedure such as rupture of the membranes or the application of Willett's forceps; for the other cases he advised Cæsarean section. What was most important, however, was to avoid delay, for this was fatal.

Dr. A. L. MUDALIAR (Madras) considered that the degree of dilatation of the cervix should be stated in describing a case of central placenta prævia. The only sure way of diagnosing the condition was to feel placental tissue; in cases of high placenta prævia, although the placenta was not actually palpable, a peculiar gritty sensation could be made out if the finger were passed up through the cervix between the uterine wall and membranes. In the treatment Dr. Mudaliar considered small doses of pituitrin useful. Cæsarean section should not be done too frequently, and must only be considered when the child was alive and when there was a reasonable chance of its surviving. The mother could be saved by simpler methods.

Dr. J. P. HEDLEY (London) did not approve of the routine adoption of Cæsarean section for placenta prævia in young women. He pointed out that the patient had to be constantly watched and was in constant fear throughout subsequent pregnancies.

Prof. R. W. JOHNSTONE (Edinburgh) said that the importance of the diagnosis prompted the Edinburgh school to examine all patients thoroughly per vaginam; they did not hesitate to resort to anæsthesia and pass the finger up into the uterus to feel for placenta. No one should temporise with placenta prævia; treatment must be immediate.

Dr. GIBBON FITZGIBBON (Dublin) thought that although Cæsarean section had a place in treatment, statistics tended rather to over-rate its utility. He referred to over 200 cases treated in the Rotunda Hospital under his Mastership in which version was employed with a very low maternal mortality. Dr. FitzGibbon thought that treatment should follow vaginal examination. There was no great urgency in all cases, and it was better to delay examination until treatment could be undertaken.

Dr. GILBERT STRACHAN (Cardiff) maintained that in many cases of placenta prævia there was a great deal of shock. He agreed that immediate saline infusion was desirable.

Dr. R. S. STATHAM (Bristol) protested against the use of submammary saline; he had lately seen two cases of sloughing of the breasts as a result of it, and he now used the flanks for saline infusion. Hot vaginal douches were pernicious. The cases should be dealt with where and when the hæmorrhage occurred, and version therefore had a useful place in treatment. He used Willett's forceps and had found de Ribes's bag of value in cases where there was a good deal of shock and the recovery of the patient had to be waited for.

Miss MARGARET BASDEN (London) said she had employed vaginal plugging with gauze soaked in Bonney's paint after rupturing the membranes; this treatment, however, had been followed by superficial ulceration of the vagina and subsequent stenosis necessitating a plastic operation. She thought that the results were good as far as the mother was concerned. She employed Cæsarean section in bad cases.

Prof. W. BLAIR BELL (Liverpool) said it was impossible to adopt uniform treatment for every case. He thought the terms "placenta prævia centralis" (p.p.c.) and "placenta prævia partialis" (p.p.p.) should be employed, the former to include all cases in which there was encroachment of the maternal os by the placenta. In certain cases Cæsarean section was the only proper treatment—e.g., with central placenta prævia in a primigravida with undilated cervix and a viable child. Of the other cases a considerable percentage could be treated by Cæsarean section. While in cases of doubt the mother's life should be the first consideration, that of the infant could often be saved without extra maternal risk. He had had two cases of post-partum hæmorrhage after Cæsarean section for placenta prævia, and suggested that this accident might be avoided by the use of pituitrin and ergotin. It should be remembered that many cases, especially where the cervix was not involved, terminated normally.

Dr. W. R. ADDIS (Manchester) said that if treatment was to be carried out at home simple methods should be devised, and any attempt at increasing the number of instruments which the general practitioner had to carry was to be deprecated. He favoured either version or rupture of the membranes, together with administration of pituitrin.

Prof. DANIEL DOUGAL (Manchester) thought that "safety first for the mother" should be the obstetrician's motto when treating placenta prævia. The high fœtal mortality was due to (1) prematurity,

and (2) separation of part of the placenta, and these should be considered carefully before any new form of treatment was introduced with the idea of saving the child. Willett's forceps ought to be employed more often. Prof. Dougal thought that the indications for Cæsarean section in cases of placenta prævia were definite and limited. It should be done only when there were chances of getting a live child.

Dr. H. L. H. GREER (Belfast) agreed with those who advocated caution before performing Cæsarean section. He always did an external version as a preliminary to bringing down a leg in cases of placenta prævia, so that the foot was over the internal os.

Sir EWEN MACLEAN (Cardiff) thought early version with slow extraction was the ideal. It was his own practice to exhaust all methods of treatment before resorting to Cæsarean section, and he asked whether the Cæsarean scar might not possibly be an ætiological factor for placenta prævia. He had one case of death from post-partum hæmorrhage following a Cæsarean section for placenta prævia. He agreed with Prof. Blair Bell about considering the child's life in deciding upon any form of treatment.

Dr. E. A. GERRARD (Manchester) urged that therapeutic methods favourable to the child should be preferred so long as the safety of the mother was not prejudiced. The partial type of placenta prævia seemed to offer most scope for improved methods. A form of treatment which involved little interference with the child and one which was nearest to the normal course of labour should prove the most satisfactory. These conditions, in his opinion, were fulfilled by Willett's method of rupturing the membranes and applying traction to the child's head by means of a forceps attached to the scalp.

The CHAIRMAN regretted that no general practitioner had spoken. He had been in practice for 47 years and had met with only nine cases of placenta prævia.

Reviews and Notices of Books.

SCIENCE AND PERSONALITY.

By WILLIAM BROWN, M.A., M.D. Oxf., D.Sc. Lond. With a foreword by Sir OLIVER LODGE. London: Humphrey Milford, Oxford University Press. 1929. Pp. 258. 12*s.* 6*d.*

IN a brief foreword Sir Oliver Lodge remarks with some surprise the versatility of the author, particularly his mathematical equipment. But Dr. William Brown has always shown in his writings the catholicity of his mind, and in addition a certain yearning for the religious and the philosophical. Unfortunately, his desire to be fair to psychology and yet keep intact his and other people's religious aspirations leads to a timidity in both acceptance and criticism. This is unfortunate in a writer who, in addition to wishing to keep abreast of advances in psychopathology, attempts to give philosophical sanction to his standpoint. One has always been led to believe that the best philosophers were, in their search for truth, dignified and logically uncompromising. It is this intellectual asceticism and austerity which is lacking in Dr. Brown's latest collection of essays. He covers the whole field of the sciences from mathematics to the normative studies of ethics and æsthetics; rightly so, since his thesis is that man's highest pursuits are the Good, the True, and the Beautiful. But in all fields he has left us vague as to what his point of view really is. He expresses very honestly his doubts about Freudian psychopathology, and makes pregnant remarks throughout his inquiry. That done, the more positive side is stated in somewhat cloudy philosophical announcements which are zealous rather than logically convincing. In this volume the author confesses a more than passing interest in the phenomena of psychical research. No psychologist has the right to ignore or to sneer at these phenomena; they call for calm and dispassionate inquiry. Dr. Brown is impressed by the data of so-called telepathic and mediumistic experiences. He gives us a sample which, however, more mundane explanations might suffice to elucidate. We should welcome from Dr. Brown an exposition of these phenomena by methods of research on the lines of his now classical work on the Essentials of Mental Measurement.

SYNOPSIS OF MIDWIFERY AND GYNÆCOLOGY.

Fourth edition. By ALECK W. BOURNE, B.A., M.B., B.Ch. Camb., F.R.C.S. Eng., Senior Obstetric Surgeon, Queen Charlotte's Hospital, London; Obstetric Surgeon to Out-patients, St. Mary's Hospital. Bristol: John Wright and Sons, Ltd. 1929. Pp. 434. 15*s.*

THE fourth edition of this book has been revised and brought up to date by the inclusion of such new matter as has been accepted as a permanent addition to our knowledge of obstetrics and gynæcology; it serves admirably as a supplement to and a substitute for the ordinary text-books for the purpose of revision before examination. One section only, in our view, deserves criticism, that on abdominal palpation. On page 26, when abdominal examination during pregnancy is described, two "grips" are advised. The next time that abdominal palpation is mentioned is in connexion with the diagnosis of occipito-posterior positions (page 93), when three "grips" are mentioned. On page 99 four "grips" are enjoined for diagnosis of face presentations and a similar number for breech on page 106, while little indication is given as to what the third and fourth grips are. This is of no moment to the experienced graduate, who sooner or later invents a method of palpation of his own, but is liable to confuse the beginners who use the book. Moreover, examiners in practical work are liable to demand precise and accurate knowledge of this important method of diagnosis. We question whether the method described on page 26, of attempting to push the head downwards and backwards into the pelvic brim by abdominal palpation alone, is really of much value, and in inexperienced hands it may well create a false sense of security. A fuller account might have been given of the modern views on the origin of pelvic endometriomata.

We know of no synopsis which better serves the purpose for which it is intended, and the book deserves the popularity it has attained.

LES OTITES MOYENNES.

By GEORGES PORTMANN, Professor to the Oto-Rhino-Laryngological Clinic in the University of Bordeaux; and KARL KISTLER, of Zurich, formerly Assistant in the Clinic. Paris: Masson et Cie. 1929. Pp. 212. Fr.70.

THE classifications of affections of the middle ear, for long purely empirical, has been put on a scientific basis by the pathological work of F. von Bezold and his pupils, F. Siebermann and A. Scheibe. But, although 30 years have elapsed since the publication of the first and only edition of von Bezold's treatise on diseases of the ear, the authors affirm that only a faint echo of his work is to be perceived in the literature of French otologists, and this book has been written to fill this gap. For the sake of accurate terminology, in this book the expressions "catarrh" and "catarrhal" have been avoided, since though they should denote inflammation of a mucous membrane, they are often used to designate very different affections. The termination "itis" expresses the idea of an inflammatory process, and therefore the expression cicatricial otitis, for a condition which is not such a process but rather the result of one, is ruled out. Again, otorrhœa is not the name of a disease, but of a symptom. These may seem small points, but the authors consider accurate

nomenclature important as an aid to the classification of our conception of diseases of the ear, which is the chief aim of their work. The term "tubal obstruction" is here used to define the class of case often described as "acute catarrhal otitis," but distinguished from true inflammation of the middle ear by the absence of pain and the complete return of hearing after inflation; "tubal obstruction with exudation" takes the place of "chronic exudative middle-ear catarrh"; and chronic dry or adhesive catarrh is classified either as "tubal obstruction with persistent retraction of atrophied drum-membrane," or as a sequel of "recurrent simple otitis," or of "necrosing acute otitis." The book is written in a concise, almost tabular form, but contains much interesting matter. In regard to chronic suppurative otitis, a distinction is made between simple and cholesteatomatous; the former, which constitutes between 60 and 70 per cent. of all cases of suppuration, is characterised by a central perforation and a non-fœtid discharge, the latter by a marginal epitympanic perforation and a fœtid discharge.

The authors do not admit the conception that chronic suppuration depends on osseous lesions, since all the true bony lesions are consecutive to cholesteatoma; in support of their view they point out that all cases of death due to chronic suppurative middle-ear disease have shown an epitympanic perforation, and have been complicated by cholesteatoma and, that over a period of years in the Central European countries they have been unable to discover a single death due to chronic middle-ear suppuration with a central tympanic perforation. This last statement is supported by statistics collected by Bezold, Siebermann, and Scheibe, which show 11,105 cases of "simple" chronic suppuration with tympanic perforation and no death, contrasted with 4281 cases of "cholesteatomatous" chronic suppuration with epitympanic perforation and 78 deaths.

The book is profusely illustrated by microphotographs, some from the authors' collection and some from those of colleagues, among whom we notice Mr. J. G. Fraser of Edinburgh. These are beautifully reproduced, and add greatly to the value of the work, which is of importance to general physicians as well as to otologists.

KOLLE AND WASSERMANN'S BACTERIOLOGY.

Handbuch der pathologen Mikroorganismen. Third edition. Edited by W. KOLLE, R. KRASS, and P. UHLENHUTH. Lieferung 18. Band V. S. 525–1036. Berlin: Gustav Fischer and Urban and Schwarzenberg. 1928. M.38.

THIS standard text-book on pathogenic bacteria needs no introduction, since it has been in international use as one of the works of reference for many years. The authors of this section have made no attempt to adopt any of the new nomenclatures of bacteria, such as that adopted by the American Society of Bacteriologists, but have been content to follow the time-honoured terminology. The volume opens with an account of the immunological aspects of *B. diphtheriæ*, by Prof. E. Wernicke and Prof. H. Schmidt. The work has been brought up to date by the inclusion of modern studies on the Schick test and on toxin-antitoxin mixtures. The description of serum sickness following the inoculation of antidiphtheritic serum is, however, confined to one short paragraph.

Prof. H. A. Gins devotes eight pages to a consideration of the *Bacillus fusiformis*. He recognises three different forms: the fusobacterium of Plant-Vincent, the fusobacterium nucleatum, and the fusobacterium polymorphum. Brief mention only is made of the interesting question of the symbiosis of this group of organisms with the spirochætes, a subject on which a good deal has been written lately in connexion with broncho-pulmonary spirochætosis, pulmonary abscess, and gangrene, but probably this subject receives notice elsewhere in this many volumed work. The rest of this section, containing some 400 pages, is given up to a consideration of the tubercle bacillus in its many aspects. Seven professors (B. Möllers, H. Selter, W. Blumenberg, E. Löwenstein, R. Kraus, W. Zwick, and S. Witte) are responsible for this part of the work, and they have discharged their responsibility with success. The pages are packed with information culled from reliable sources. Searching for observations on questions specially prominent at the present time, we find a useful summary of the so-called filtrable virus form of *B. tuberculosis*; the existence of these Möllers considers still sub judice. De Witt and Long's recent work on the chemistry of tuberculosis seems to have escaped notice in the chapters on the chemistry of the bacillus. In dealing with the different types of tubercle bacillus occurring in man and animals the exceptional figures given for Edinburgh by John Fraser are tabulated separately from those quoted from other authorities. It would be interesting to get confirmation of these results by another research under post-war conditions. L. Cobbett's book, the "Causes of Tuberculosis," which gives so much valuable information on tuberculosis in man and animals is not mentioned; being a war-time publication it has not received in continental countries the publicity it deserves. A. S. Griffith's work on the atypical forms of tubercle bacilli found in lupus is dealt with fairly fully. There is also a long and careful analysis of the work of the Calmette school on the B.C.G. culture of tubercle bacillus and its use as a vaccine. Prof. Kraus comes to the conclusion that when inoculated into animals this strain is capable of producing a benign infection with non-progressive lesions which tend to heal, that the strain is therefore analogous to "virus fixe," and that it is capable of being used as a prophylactic vaccine under adequate control.

Other modern developments in bacteriology are critically and sanely considered in this comprehensive work; the broad historical basis on which it is compiled and the successful efforts made to keep it up to date maintain its title to a proud position among works of reference.

The Newer Knowledge of Bacteriology and Immunology. Edited by EDWIN O. JORDAN and I. S. FALK. London: Cambridge University Press; Chicago: University of Chicago Press. 1928. Pp. 1196. 50*s*.

ADEQUATE praise may appear exaggerated here. There are over a thousand pages and 82 contributors, and the general standard of the articles is high. Each forms a summary of contemporary knowledge, with a very full list of references. Certainly no bacteriologist can afford to overlook this work, which is sure to save him a great deal of labour in analysing the literature of many outstanding problems. Many of these papers present synopses of matters too new to have become the subject of monographs. Such are the articles on toxins and the estimation of their strength, on the use of human serum from convalescent patients in prophylaxis and treatment, and the isolation of substances with immune properties. The articles on the spirochætes and the bacteriophage are also memorable, and several papers are included on the bacteriology of dairy-farming. We regret that workers other than American are insufficiently represented—through no fault of the editors we are assured.

ST. JOHN AMBULANCE BRIGADE.—In the report for 1928, which has just been issued, Major-General Sir Percival Wilkinson, the Chief Commissioner of the Brigade, states that 317,671 cases of accident and sudden illness were dealt with, in addition to many thousands of unrecorded cases. During the year there was an increase of 104 divisions, with a personnel of 3662. The strength of the Brigade is now 1684 divisions and 51,631 persons, of whom 13,409 are women; there are, in addition, 292 cadet divisions. There was a large increase in the calls upon the service, and the 106 ambulances traversed more than 271,000 miles. Sir Percival Wilkinson adds: "The desire to join our ranks is reaching all grades of society, all ages, and all professions."

THE LANCET.

LONDON: SATURDAY, AUGUST 24, 1929.

DERMATOLOGY AND GENERAL MEDICINE.

VIEWS upon the functions of the skin and their importance in general medicine have changed a good deal of late years. From being regarded as a protective covering having little relation to vital internal processes, we have come to appreciate the close and intimate associations of the skin with biological activities hitherto held to be but little connected with it. In many ways we have reverted to the opinions of the old-time physicians who laid great stress upon the normal functioning of the skin, and we have been able to elucidate some of the mechanisms by which the benefits of this functioning may be brought about. Thus we have come to realise, for example, the remarkable interdependence of cutaneous activity with that of the vegetative nervous system, and to learn that the powerful influence of season and climate upon health and well-being acquires some explanation through this association. In the Lettsomian lectures, whose publication commences in this issue, Dr. H. W. BARBER discusses aspects of this important question which have already received attention. It has been shown by CRAMER and others that an influential governor of the activity of the thyroid-adrenal apparatus is found in the heat-regulating function of the skin; moreover, the effective stimulus to this system is change of temperature rather than the exact level at which the temperature is set; variations in climate and rate of movement of air effect more than constancy of heat or cold or the degree of moisture present. Of all climatic factors influencing the human organism the rate of air movement and the intensity of the solar radiation are perhaps the most important. The former, by leading to increased cooling of the body, provokes an increased activity of the thyroid and adrenal, and produces a more rapid oxidation and higher gaseous exchange. Light clothes and a non-stagnant atmosphere are thus important adjuncts to treatment, a point which JAKOWENKO [1] has lately emphasised in a study of the stimulating effect of sun and air baths at health resorts upon metabolism. It is possible, as recent work has shown,[2] that cooling itself may lead to the formation of a histamine-like substance in the skin—such as Sir THOMAS LEWIS has shown to be formed after vessel injury—upon which the general effects of cold are mainly dependent. The liberation of an "H-substance"—according to LEWIS'S brilliant researches—is in the nature of a defence mechanism, being a normal response of the skin tissues upon which reactive hyperæmia, inflammatory changes, anaphylaxis, and similar processes largely hang. Prof. FRÖHLICH'S work, too, has shown the importance of seasonal variations upon the permeability of vessel walls, and the condition known as chilblains is probably an abnormal response of some such defensive process to undue chilling.

The action of sunlight, and especially of the ultra-violet rays of sunlight, is as yet far from fully explained. Their effect is mainly upon the skin, for they do not act deeply, and the problem is intimately bound up with that of epidermal pigmentation. That they lead to a formation of vitamin D in the skin layers is probable, and that their effect is in some way connected with the sympathetic nervous system and the adrenal bodies is undoubted. A chemical hormone is suggested as the medium by which such connexion is effected, and extracts of pigmented skin are said to be both pressor and mydriatic, which points to adrenalin or some similar substance being concerned. Irradiation of the skin, however, while causing increased pigmentation, tends to lower sympathetic tone, though in therapeutic doses ultra-violet light has little effect upon blood pressure, pulse-rate, or basal metabolic rate (FRIES and TOPPER).[3] There are, moreover, important constitutional factors also involved, a point in the study of skin diseases which Dr. BARBER emphasises opportunely. In no branch of medicine are constitutional variations in individuals more clearly illustrated than in the investigation of skin responses to irritants or infections. The blonde subject with soft pale skin who blisters readily on exposure to sunlight has long been known to be less resistant to tuberculosis than the brunette who pigments readily in the sun and in whom tuberculosis, if contracted at all, tends to run a more benign course. An immense number of skin tests have been devised with the object of determining such constitutional variations in skin responses, and to such variations much of the incidence of skin diseases is due. Dr. BARBER exemplifies such factors by the case of three common external infecting agents of the skin, the pityrosporon, the acne bacillus, and the staphylococcus. He has done great service in pointing out afresh the importance of the seborrhœic "diathesis," or as he has termed it, the "status seborrhœicus," and has drawn a striking picture of the two types of this "diathesis," worthy of the study of all physicians. He holds with others that its essential change is an alteration in the secretion and composition of the cutaneous fat.

Such a conception must clearly have significant and practical bearing upon treatment, and we must look further than the purely local lesions in such conditions as are under discussion. Thus changes in the endocrine glands (particularly, as SABOURAUD insists, in the sex glands), in the digestive organs, and in the excretory organs should be looked for in the examination of such cases. The possibility of intestinal toxæmia as a factor is also suggested by Dr. BARBER, and in this connexion it is interesting to recall that LLOYD ARNOLD [4] has lately shown that the bacterial flora of the small intestine may be altered by both diet and climatic changes. Clearly both can be of the utmost importance in the treatment of skin disease. The former by perhaps affecting the nature of the cutaneous fat not only through changes in its quantity but also in its quality, the latter by its influence upon the endocrine glands and the vegetative nervous system. The relationship of fat metabolism to intestinal auto-intoxication and to cutaneous manifestations is one which, as Dr. BARBER suggests, may well repay more complete biochemical investigation. The rare conditions of acanthosis nigricans, which occurs in association with malignant disease

[1] Jakowenko, W. A.: Amer. Jour. Hyg., July, 1929, p. 165.
[2] Horton, B. T., and Horton, G. E.: Amer. Jour. Med. Sci., August, 1929, p. 191.
[3] Fries, M. E., and Topper, A.: Amer. Jour. Dis. Child., 1927. xxxiv., 166.
[4] Arnold, Lloyd: Amer. Jour. Hyg., 1928, viii., 604.

of the peritoneum and bowel, and of xanthoma, which is invariably associated with greatly increased cholesterol content in the blood, are of interest in this connexion. It is not only, however, with regard to the sebaceous glands that we should pay attention to dirt, climate, and "diathesis." The same wide view of skin disorders must be taken in other conditions besides those of the "seborrhœic state." Eczema and urticaria are, of course, two notable examples in which general principles can never be subordinated to local measures; hyperhidrosis, pruritus, alopecia areata, von Recklinghausen's disease, to mention but a few, show also the importance of nervous factors in ætiology. It is, in fact, not only in ætiology but also in diagnosis and treatment that close study of the skin may reward the general physician, and ever more must a close study of the body as a whole repay the dermatologist.

THE SIGNIFICANCE OF CAROTIN.

CAROTIN and closely associated lipochrome pigments are widely distributed throughout the world of living organisms, but nothing has been definitely known of any physiological function which they perform in either plants or animals. It seems impossible that they are of no advantage to the plant body, where they are made, but their presence in animals might, of course, be due to their passive ingestion in food.

The frequent association of carotin with substances rich in vitamin A was early noticed and was followed up by J. C. DRUMMOND and by H. STEENBOCK, and with various collaborators. STEENBOCK found the association in plant tissues to be very close. Yellow maize, for instance, was well supplied with vitamin A, whereas white maize was not; whilst in the varieties with intermediate shades of colouring the vitamin A value was found to be proportional to the depth of yellowness. In the case of animal fats, however, the parallelism is less exact, and it appears to break down altogether where the liver oils are concerned, although these oils also contain unidentified lipochromes. Carotin itself was actually fed to rats as a source of vitamin A by DRUMMOND (1919, 1920, 1925), by M. STEPHENSON (1920), and by STEENBOCK (1921). The two former got negative results, but STEENBOCK, using recrystallised carotin of constant melting-point, found that it promoted growth in rats on a deficient diet. All these observations, however, except that of DRUMMOND in 1925, were carried out at a time when the fat-soluble vitamins A and D were not differentiated and all tests of substances for vitamin A which were performed in that period are now regarded as unreliable. DRUMMOND'S observation of 1925 is not open to this criticism, and has stood in the literature as the chief evidence that vitamin A cannot be supplied in the diet as carotin. This year he has repeated his experiments,[1] and again obtained a negative result, using a highly purified carotin of melting-point 184·9° C. Three other sets of workers, however, report results different from his, but corresponding with one another's. EULER, KARRER and co-workers, THOMAS MOORE, and SMEDLEY-MACLEAN, HUME and co-workers, have all found that vitamin A is adequately supplied to a rat on a deficient diet by a daily dose of 0·01–0·005 mg. of recrystallised carotin. The last-named group found even 0·003 mg. to be a sufficient dose of a carotin of melting-point 178° C. and of iodine value 330, and also that the minimal dose decreased with the increasing purity of the preparation. It is true that the melting-point of some of the carotin used by DRUMMOND was higher than that of any used by the other workers, and the truth may simply be that he is working with the pure substance, whilst the others are employing a contaminated carotin in which the contamination represents vitamin A. The situation would then be very like what happened in the case of ergosterol, the parent substance of vitamin D, which proved to be a contamination of cholesterol. On the other hand, something very much more fundamental may be at stake, and it may be that when the cause of the discrepancy between DRUMMOND'S result and those of the other workers is explained, our understanding of the chemical nature of vitamin A may be much advanced; though even if pure carotin is found in certain circumstances to supply vitamin A, some additional explanation is needed to include the means by which the vitamin is supplied in liver oils. A contribution by Mr. MOORE on p. 380 of our present issue probably brings this explanation a step nearer. In the circumstances of his experiment, the consumption of carotin in large excess by two albino rats did not lead to any considerable increase of pigment in the liver, but was followed by great intensification of the antimony trichloride colour reaction for vitamin A, also in the liver. The observation suggests rather forcibly that the large consumption of carotin had in some way contributed to the formation of a reserve of vitamin A. A further observation of great interest is recorded by EULER and KARRER, but awaits confirmation. They have tested several other lipochrome pigments and their derivatives as sources of vitamin A; most of these were negative, but one, dihydro-α-crocetin, is reported to be active for rats in a daily dose of 0·015 mg.

The problem from the point of view of the colour test for vitamin A was discussed in our columns on August 3rd by Mr. MOORE, who pointed out how the intrusion of carotin concentrates, rich in vitamin A, has vitiated the reliability of the antimony trichloride colour test for vitamin A; for such preparations of vitamin A of plant origin a biological test with rats is the only criterion, but the colour test is still held to be valid in the case of liver oils. Should it prove that carotin can in certain circumstances supply vitamin A, another series of researches, which hitherto have somewhat baffled interpretation, would receive an explanation. F. P. UNDERHILL and co-workers,[2] and J. GOLDBERGER and co-workers,[3] last year both described a condition called "black-tongue" in dogs, which is produced on certain diets. GOLDBERGER'S syndrome is cured with yeast and seems to represent pellagra in the dog. UNDERHILL'S syndrome is not cured with yeast, but with butter, pig's liver, eggs, carrot, and recrystallised carotin. The condition is said not to have been cured with cod-liver oil, and on this ground, and because it is curable with pure carotin, the possibility that it is due wholly or partially to a vitamin A deficiency is dismissed. The diet used appears incomplete in other ways, but on the whole, in view of the list of curative substances, and in the light of the new evidence about carotin, the suggestion that this form of black-tongue is due to vitamin A deficiency certainly deserves reconsideration.

[1] Duliere, W. L., Morton, R. A., and Drummond, J. C.: Chem. and Ind., 1929, xlviii., 518.

[2] Underhill, F. P., and Mendel, L. B.: Amer. Jour. Physiol., 1928, lxxxiii., 589.

[3] Goldberger J., and others: United States Pub. Health Rep., 1928, xliii., 1385.

CARDIO-AORTIC SYPHILIS.

BOTH the difficulty in diagnosis and the disappointing results of antisyphilitic treatment in cardio-aortic syphilis were referred to by those who took part in the discussion on this subject at the meeting of the British Medical Association, a report of which appeared on p. 330 of our last issue. There is a general consensus of opinion that the common cardiovascular syphilitic lesion is an aortitis. This often gives rise to no symptoms whatsoever, and is only discovered post mortem in a patient who has died of some other disease. Sometimes, however, the aortitis leads to aneurysm of the aorta—perhaps the most distinctive of the syphilitic lesions, since it is so rarely due to other causes. Sometimes the process involves the root of the aorta producing incompetence of the aortic valves, or leading to partial obstruction of the orifices of the coronary arteries with its sequel angina. Aortic incompetence is, however, also a common result of rheumatic infection, though it is then generally associated with mitral stenosis. Similarly coronary arterial disease may be a part of the general degenerative process accompanying senescence, and the resulting ischæmic fibrosis is of a similar nature to that produced by syphilis. Age, therefore, is an important consideration in the diagnosis. Rheumatic heart disease is essentially an affection of youth, while atheromatous changes appear late in life. Syphilitic heart lesions, on the other hand, generally become manifest between the ages of 35 and 50, and the sudden appearance of anginal symptoms or the discovery of aortic regurgitation, in a previously healthy subject, in middle life, should at once arouse suspicions of a possible syphilitic ætiology. The Wassermann reaction is less helpful in diagnosis than the casual observer might anticipate. As several speakers pointed out, symptoms of heart disease plus a positive Wassermann are by no means conclusive of cardio-aortic syphilis, and still less does a negative Wassermann exonerate syphilis as the causal factor. The symptoms of cardiovascular involvement do not generally make their appearance for 15 years or more after the primary infection. But, once they have appeared, the progress of the disease is often rapid, and it is unusual for the patient to live for more than two or three years after the condition is first diagnosed. By thorough antisyphilitic treatment of the primary infection we may hope to prevent the development of cardiovascular lesions; but when once those lesions can be recognised, neither arsenic, mercury, nor iodides will give more than a temporary relief. The treatment then becomes that of heart failure, and antisyphilitic remedies are a secondary consideration.

It is possible that the future may have in store new developments in the clinical outlook on cardiac syphilis. WARTHIN has been able to demonstrate the presence of spirochætes in the heart muscle of a series of patients who died suddenly after a brief period of ill-health—generally less than 48 hours. These cases he regards as examples of malignant exacerbation of latent syphilis. He has also demonstrated certain more chronic lesions of the heart muscle which he believes to be pathognomonic of syphilis, and is of the opinion that syphilitic myocarditis is a much more common condition than is generally believed. At the present time there is no link between these pathological findings and the clinical manifestations, but the evidence is sufficiently definite to suggest that it may become necessary to modify our present view of cardiovascular syphilis as being essentially an aortitis.

RAY LANKESTER.

SIR EDWIN RAY LANKESTER, whose death at an advanced age occurred last week, was the most widely known man of science in England, and among not only his acquaintances but his intimate friends he could count a large number of medical men of every sort of different standing or specialty in the profession. By family ties this was made probable, for he was the eldest son of Dr. EDWIN LANKESTER who succeeded the founder of THE LANCET as medical coroner for Central Middlesex, while his brother is a well-known physician, and his own training, after a boy's acquaintance with classics, was purely on scientific lines. Thus it was natural that LANKESTER should appreciate, instinctively or logically, the aims of medicine, and medicine owes him a debt in many directions. He was the leading zoologist in this country, and we do not know who has a better claim than LANKESTER to be considered the leading zoologist of the world. Not only was his equipment perfect but he had a genius for communicating his knowledge. As lecturer and author alike, his clear arrangement of material and his logical methods of expression introduced to a varied public those scientific aspects of biology which were exactly needed for a comprehension of the large outlook of medicine; and his immediate pupils, who benefited alike by his genius and his friendship, became themselves agents for spreading still further the doctrines of progressive biology. Through them, as through his own great personality, LANKESTER can be considered a pioneer along many different lines of medical thought and work—lines which would never have been laid down had it not been for the constructive genius and power of logical coördination which suggested them.

Annotations.

"Ne quid nimis."

INFANT MORTALITY.

AT the end of the week there was issued from the Ministry of Health a Report on Infant Mortality,[1] constituting the English contribution to an international inquiry which has been instituted by the League of Nations. In accordance with a general plan the English inquiry takes the shape of an investigation in certain parts of Staffordshire and in Sunderland where infant mortality is relatively high, and in Oxfordshire and Croydon where it is relatively low. The primary object of the inquiry was to ascertain the causes of infant mortality in these centres during 1927 and 1928, and previous investigators of the subject will have the satisfaction of knowing that the general findings of the inquiry support views which are already held, little having been elicited that was at variance with English experience.

Throughout the Report the subjects of infant mortality in these districts are considered under two heads—namely, (1) stillbirths and deaths during the first six months of life (neonatal deaths), and (2) deaths from postnatal causes—and the main part of the Report is taken up by an analysis of the principal causes of these two groups of deaths in the four selected localities. The analysis is accompanied by statistical notes from Dr. Peter McKinlay upon such points as mortality in relation to the order of birth in the family, the birth-rate in relation to the social

[1] International Inquiry, Health Organisation of the League of Nations (English Section). Report by Dame Janet Campbell, M.D. With Statistical Notes by P. L. McKinlay, M.D.

status and housing conditions of the family, and the mortality in relation to those conditions, and in relation to the age of the mother, and the well-being or indigence of the family. The general findings of the Report are confirmatory of previous experience in respect of all the circumstances adduced. Thus first pregnancies are found to be attended with a higher death-rate than is met with in the immediately subsequent group of births, but the latest children born have, on the whole, the highest mortality-rate. Clinical experience would have anticipated this, as it would also have anticipated the conclusion that bad housing and overcrowding are definitely prejudicial to infant life, although neonatal cases are much less closely associated with a dense population than are the deaths from postnatal causes. There is a fairly clear dividing line between the causes of stillbirths and neonatal deaths on the one hand and deaths after the first month of life on the other. Out of 1083 deaths investigated in the selected districts, 774 were either born dead or died during the first month of life, prematurity and obstetric difficulties, including ante-partum hæmorrhage, accounting for the figures; while in the second group of older infants we find respiratory diseases and gastro-intestinal diseases, many of which have an infective origin, to constitute the main scourges of infancy.

The manner in which the investigation has been conducted makes the Report a valuable document for reference; new facts or new doctrines it may not contain, but it forms a good example for local investigation with regard to a subject which every health authority of the country must keep prominently before their own and public attention. The first concrete suggestions of the Report are that general sanitary environment, and particularly housing, requires improvement, and that there should be established throughout the country a maternity service for mothers whose circumstances call for such aid, the service to include adequate attendance at childbirth and hospital provision for abnormal cases, or where domestic environment calls for it. Other suggestions are, and naturally are, that home-visiting and welfare centres should be developed, that a domiciliary nursing service should be instituted, and that domiciliary medical attendance under the National Health Insurance service should be extended and hospital accommodation for infants increased. At the close of the document appear the following far-reaching and valuable pieces of advice—namely, that further scientific investigation of infant hygiene should be conducted together with training of medical students in the subject, and that the public generally should be educated in the importance of securing suitable provision for maternal and child welfare. Dame Janet Campbell's words which close the Report allow that little elucidated or suggested in it will be new to students of this question, but describe the paramount value of the investigation as lying in the more exact definition and emphasis of certain known but not always fully recognised facts and in the clearer light which it throws upon conditions under which many babies now live and die. She would have us not rest content with thinking that the present machinery for supervising infant health and welfare is relatively complete and satisfactory, for "much yet remains to be done before it can be said with truth that the pregnant woman and the young infant are receiving all the support and all the assistance due to them from the community if the children of the nation are to multiply and prosper." Every social worker will be in agreement here.

NERVES IN CANCERS.

THE most fundamental character of tumours is their functional isolation from the harmonious corporation of the body in which they live; they live for themselves alone. Correlated with this isolation is the traditional fact that they have no blood-vessels or nerves of their own; we call it a "fact" because there is still no reason to doubt that in a broad general way it is true. The more we know of tumours, however, the more we realise that they grade into normal tissues, structurally and functionally, and some of them reproduce something of the physiological action as well as the histological structure of the organs from which they spring. We might therefore expect that in some instances tumours might be found to have some blood-supply and some nerves of their own, not to the normal extent but imitating it in greater or less degree. That secondary tumours may excite a new growth of vessels out of proportion to the connective tissue reaction has been known for some time. A few observers have claimed that they may do the same with nerves, and Prof. H. Oertel, of Montreal, has lately published [1] the results of a long search in human tumours by the new silver methods. He shows beyond much doubt that nerves can be found in a good many new growths, and from their intimate disposition in relation to the neoplastic cells he seems to have made out a fair case for his belief that they are in functional relationship to the tumour tissue, supplying the parenchyma as well as the vessels and connective tissue. By the nature of the case anatomical evidence by itself can hardly be quite convincing, but his descriptions and illustrations merit careful study. Negative findings are of little importance; knowing the lawlessness of tumours in general we should hardly expect that all of them would have nerves, and that most have no nerves is no great argument against the thesis that some possess them.

PNEUMOCONIOSIS.

THE list of pneumoconioses, as every student knows, begins with anthracosis, a term applied to a pulmonary fibrosis affecting the workers in coal mines and, more loosely, to the pigmentation of the lungs of town dwellers as commonly revealed at autopsies. The researches of André Jousset [2] who has made a careful pathological and chemical study of the pigment found in the lungs of both town dwellers and coal miners, indicate that the use of the word anthracosis in either connexion is incorrect. He maintains that what has been assumed to be carbon is in reality a residue of black oxide of iron, "not physiological dirt but pathological dross." The black oxide may be the legacy of hæmolysis following stasis, in which case yellow pigment is produced, or of infection and inflammation which whether acute or chronic results in a deposit of black pigment. The mixture of the two pigments commonly found points to their community of origin. The large detached alveolar cells, often described as "dust cells," according to Dr. Jousset do not contain infected particles of inhaled carbon or other foreign matter, but pigments representing different degrees of oxidation of iron derived from hæmoglobin. When tuberculosis has been found in the "anthracotic" lung, it has been assumed that the tubercle bacillus has found a suitable nidus in tissues which have undergone fibrosis due to the irritation of inhaled carbon. But carbon is not a pulmonary irritant and the examination of the sputa of miners made at intervals after they have left the mine shows how rapidly the lungs clear themselves of coal dust. The source of the pulmonary pigment must be found elsewhere. Dr. Jousset points out that pulmonary tuberculosis is always accompanied by a deposit of melanin which impregnates even the smallest tubercles and is especially well seen in the environment of cavities. Thus the pigment, in these cases as in other congestive and hæmorrhagic states of the lung, is the result and not the precursor of disease. The French miner, as such, is neither more nor less liable to consumption than other workers. But mining is not simply a matter of digging for coal, operations in many of the French coal mines include rock-drilling,

[1] Jour. of Path. and Bact., 1929, xxxii., 557.

[2] Rapports de l'anthracose et de la tuberculose pulmonaire, Rev. de la Tuberculose, 3e Série, 1928, ix., 884.

and in work of this type inhalation of siliceous dust is possible. It has been found that workers at the rock-face are specially liable to pulmonary complaints. An analysis of the lungs of miners who had died as the result of accident showed a comparatively high percentage of silica and iron. Silicosis, sclerosis, and pigmentation would thus seem to be three stages in the development of "miners' lung."

If too much attention has been paid to anthracosis as a possible source of disease, too little has been paid to other occupational causes of pulmonary fibrosis. Attention has recently been directed to the grave results which may follow the inhalation of asbestos dust in factories for the carding and spinning of this substance.[3] Asbestos fibre contains a relatively high percentage of silica and this differs from carbon in having an intensely irritant action upon the mucous membrane of the bronchial tree. Pulmonary asbestosis, when once established gives rise to an intense dyspnœa which precludes the patient from the slightest exertion, may be accompanied by extreme cachexia and often leads to an early death from broncho-pneumonia. If the student must omit anthracosis from the head of his list of pneumoconioses asbestosis should be substituted for it, at any rate, till more vigorous action on the part of those charged with the supervision of factories and the control of occupational diseases has reduced the incidence of this disease.

EXPERIMENTAL ELECTRIC SHOCK.

A COUPLE of years ago we commented[4] on a paper in which Dr. R. W. Ian Urquhart, of the University of Toronto, described experiments on the effect of strong alternating currents on the nervous system of animals. He showed then that when an alternating current of suitable strength was passed through the base of the brain, the nerve centres were paralysed or blocked in such a way that the respiratory, vagal, and conjunctival reflexes were inhibited. Provided that there was no charring, these reflexes returned after a time if efficient artificial respiration was kept up. In collaboration with Dr. E. Clark Noble, Dr. Urquhart now records[5] further observations on this condition, which he terms a-c block, to distinguish it from the anelectrotonus produced by a direct current. Shocks were administered to the cardinal centres of the brain and spinal cord and to the sciatic nerve of rabbits. In the experiments on the brain, one of the vagus nerves was isolated and severed at the level of the cricoid cartilage and arranged so that the central end could be stimulated by weak induction shocks. The occipito-atloid membrane was exposed, and a special button electrode applied to it. A point electrode was inserted high up the nose. The current, which was applied as soon as the animal was enough recovered from the anæsthetic to give a conjunctival reflex, varied from 1200 to 1850 milliampères, and was passed for two seconds. Artificial respiration was begun as soon as possible after the current was broken, and it was found that normal respiration returned at varying intervals up to three and a half minutes, the pupillary reflex and vagal response reappearing decidedly later, always within a few seconds of each other. The relative shortness of the block was presumably due to the immediate commencement of artificial respiration. Further tests of no little clinical importance showed that if resuscitation was delayed for two and a half to three minutes, the animal rarely recovered; that no advantage was gained by the use of pure oxygen or of oxygen and carbon dioxide mixtures, and that the chance of recovery was not increased by injections of adrenalin. Currents of varying frequency all produced much the same results. Tests were also made on ten rabbits to determine the truth or error of the current belief that shock patients sometimes relapse after spontaneous breathing has been re-established. Two of the animals were found dead next morning, but the other eight were apparently quite unharmed. Since the cause of death could not be ascertained, the authors regard the experiment as inconclusive. The attempts to demonstrate block in the spinal cord met with many technical difficulties, but it was established that a current of 750 ma., applied for two seconds, produced a block lasting five minutes in a decerebrate cat. In the sciatic nerve of the rabbit the smallest current that would produce block was 2 ma., applied for two seconds. The block was confined to the length of nerve through which current was passed, and did not spread as in anelectrotonus. Its duration varied directly with the strength of the current, and after a certain limit recovery did not occur.

These experiments bear out still further the importance of starting artificial respiration immediately after an electric shock. They show that whereas it is possible to save life and health by immediate first-aid, a delay even of a couple of minutes may mean the loss of the patient. This fact should be impressed on the minds of all electrical workers.

[3] Pulmonary Asbestosis. By W. Burton Wood. Tubercle, 1929, x., 353.

[4] THE LANCET, 1927, ii., 1001.

[5] Jour. Indust. Hyg., 1929, xi., 154.

THE ANXIOUS LITTLE TACHYPHAGE.

New York is said to possess an organisation known as the Three-hours-for-lunch Club, which was devised to combat the evil influence of the quick-lunch counter. The "anxious little tachyphage," a type of dyspeptic admirably described by Dr. Paul Michon,[1] would certainly not be eligible for membership until he had radically revised his habits. Live with him for a day, says Dr. Michon, and his digestive troubles will be more easily understood. He wakes in the morning with a tight feeling in his epigastrium at the thought of what is before him, lies in bed too long thinking about his troubles, hurriedly gets through his dressing, toys with his dull breakfast, and rushes off to the office. At every delay on the journey the epigastric discomfort reminds him of its presence, and a morning spent in telephoning, interviewing, and correspondence harasses him still further. Home to lunch with the telephone too close to his table, he bolts his food, drains his glass at one gulp, and throughout the meal crumbles bread and chews at it nervously. Then to the office again, he throws himself once more into the press of business, and ends the working day with a hurried dinner so as to rush off to a theatre or reception. This sort of thing continues year after year, its victim constantly denying the possibility of anything going wrong with his health, until quite suddenly the suggestion of an ulcer or growth in his stomach brings the "tachyphage," a little more anxious than usual, to the physician. Unless he is lucky enough to meet someone who really understands the sort of life he leads he may quite well be sent away with merely an alkaline powder and some pious hopes about his diet. Dr. Michon insists on the essentially psychopathic nature of the malady and prescribes his treatment under three headings. First, there is the direct treatment of the stomach, and this is to be reduced to a minimum. Alkalis are definitely forbidden, and all that is allowed is a powder of animal charcoal or of kaolin before the main meal of the day. Secondly, there is the treatment of the "tachyphagia"; instructions for this must be written. Regular hours for meals and a generous allowance of time for each meal are important, while papers, messages, and the telephone must be banished during its progress. At the meal itself solids must be chewed and not bolted, and liquids taken in small portions throughout, while a definite and reasonable ration of bread should be selected beforehand and not exceeded. Thirdly, the general anxious state must be dealt with by what some people may call psychotherapy and others common sense. Walking without hurry should be substituted as far as possible for other modes of transport, while moderation in all work

[1] Presse Méd., July 20th, p. 952.

and the various forms of pleasure-seeking must be tactfully counselled. Medicaments to curb the activities of the sympathetic nervous system, such as belladonna, may be administered before meals, and especial attention should be directed to securing regular hours of sleep, for which purpose sedatives such as valerian and the bromides are recommended. This is all very well, a critic may say, but how is one to tell that this sort of treatment is all that is required, and how many times will a real case of gastric ulcer or of malignant disease give much the same sort of vague story as this other type of case? Dr. Michon does not despise radiological assistance, but he thinks the diagnosis pretty evident from the patient's appearance and behaviour. Look at this man, he says, still young, who comes to consult you for gastric trouble. His rapidly roaming eye looks first at one corner of your consulting room, then at another, now stares you straight in the face, now is off on another tour of inspection. His restless face looks as if the worst is about to happen, and in a brief and nervous way he describes his symptoms, none of which really suggest the idea of an organic lesion. Such, he holds, and with good reason, is the clinical picture of the "anxious little tachyphage"—a figure who is becoming increasingly common in these islands. Possibly the best way to combat this occupational disease would be to invite the Three-hours-for-lunch Club to start a mission in England.

HEALTH AT THE JAMBOREE.

THE organisation of the Boy Scouts' World Jamboree at Arrowe Park, Birkenhead, nowhere showed to better advantage than in the medical department. The hospital, which was in charge of the Medical Commissioner, Lieut.-Colonel J. C. Holdich Leicester, consisted of nine marquees and six bell tents. Four of the marquees were wards, each holding 16 beds. Another was divided into two parts, one-third of its space being used as a dispensary and the rest as an emergency operating theatre. A sixth marquee, similarly divided, served as a dental clinic and an out-patient department. The remaining three were used respectively as an office, a store, and a dining-tent for the staff. One of the bell tents was a store-room for patients' clothing and the other five were isolation wards. A small portable plant supplied the hospital with electric light, and all the units were linked by telephone. Cooking was all done out-of-doors under a corrugated iron roof. The Cheshire Girl Guides Association supplied the entire nursing and executive staff, whilst Colonel Leicester was assisted in his medical work by three local practitioners and a number of local honorary consultants. The dental clinic was under the supervision of Mr. H. H. Tomlinson, who was assisted by a staff of six dentists.

More than 30,000 scouts attended the camp, and it is surprising that in the three weeks only 321 had to be admitted to hospital. Of these, 52 were evacuated to local hospitals as being likely to need attention for more than a few days; this figure included nine cases of infectious disease sent to Birkenhead Fever Hospital. All the rest returned to their units relieved or cured. Tonsillitis accounted for 70 cases, and the next commonest types of ailment for which admission was necessary were cuts, stings, or bruises (39 cases). These were closely followed by chills, malaria, and malaise (28 cases), and pyrexia (26 cases). There were 21 fractures and dislocations, 14 sprains, 15 cases of constipation and colic, and 14 of other stomach troubles. Considering the mud and damp in which the camp has lived, the proportion of respiratory disorders was low; there were 11 cases of asthma, bronchitis, and catarrh, 8 of "influenza," and 7 of pneumonia and pleurisy. Coughs and colds might have been expected to number more than 80, while rheumatism accounted for only 3 admissions. Twenty operations were performed for the reduction of fractures and repair of other injuries. The out-patients' department was attended by 1229 boys, 271 of whom had cuts and wounds (68 septic), and 125 had boils. Scalds, burns, sunburns, and abrasions accounted for 108 more. Naturally the greatest number of in-patients were English: 160. French followed with 47, and Scottish 12, Welsh 12, Irish 11, and American 9, came next. A really remarkable absence of epidemic disease and of serious illness in such a large concourse was very largely due to the efficient hygienic precautions taken by the Assistant Camp Chief (Health), Major M. B. Ritchie, ably seconded by the Hygiene Commissioner, Dr. Richard Wyse. The stagnant pools in the woodland areas were freed from infestation and the water-supply was carefully planned. The latrines were adequate in number and suitably placed, and an expert staff saw to their emptying and cleansing. The camp was patrolled by members of the St. John Ambulance Brigade and the British Red Cross Society, and whenever possible the boys were medically examined before coming to camp. There is a first-aid post under medical supervision at the rest camp organised at Earl's Court for scouts who wish to stay in London before or after the Jamboree. Here, again, local hospitals are coöperating cordially. The organisers and medical staff are to be congratulated on the success of their work, which may well form a model for future encampments of the same kind.

THE TREATMENT OF ENURESIS IN CHILDREN.

THE psychological causation of nocturnal enuresis in children is much emphasised nowadays, and many writers discredit all forms of treatment by medicaments, diet, restriction of fluid, or the various forms of surgical intervention. Two recent papers illustrate possible methods of approach along the lines of what is called psychiatry. Dr. R. C. Hamill[1] holds the view that enuresis is a conduct disorder and can be perfectly well stopped when the child so desires. He explains to both child and mother that the only reason why the bed is wet is that the child prefers a wet bed to getting up, and once the child admits this and assumes responsibility for its conduct a cure is effected. In Dr. Hamill's opinion any other suggestion will only be detrimental to the child's interests; to accuse the tonsils, prepuce, hereditary influences, and so on will merely furnish the child with excuses for its ill-behaviour. With a young child the mother must quietly assume that nothing short of a dry bed every night can possibly be expected from her offspring, and with an older one, who can understand Dr. Hamill's ingenious explanation of conscious control during sleep, a few talks at the psychiatric clinic will usually complete the cure. Out of 80 cases thus treated 40 were entirely rid of the habit, and of the other 40 some were improved, some not improved but still under treatment, and some had been lost sight of. Dr. Hamill claims that this treatment is "specific," and Dr. I. S. Wile makes a similar confident claim of great success for two methods of treating enuresis which he brings forward.[2] Dr. Wile says that for cases of enuresis in institutions the method of personal approach to each child is quite impossible, so in the first of his two methods a "group approach" was employed. In this scheme the inmates of the institution—the Hebrew Orphan Asylum in New York City—were divided into teams, and the object of the campaign was explained separately to the boys and girls. Each team elected a captain, and each week the percentage of dryness was calculated for the various teams so as to foster the competition spirit. The method employed by the teams was left to their discretion, but the usual plan was to wake up the offending members or to encourage the weaker members to greater efforts by means which are not stated but can be imagined. When a member of one of these

[1] Jour. Amer. Med. Assoc., July 27th, p. 254.
[2] Med. Times, August, 1929, p. 223.

enuretic teams had remained dry for four weeks he or she was allowed to enter a regular dormitory. This scheme worked very well over a year, and for the second year the boys and girls were allowed to carry on without the interference of the "psycho-pediatrician" with equally satisfactory results. The second plan which Dr. Wile employed was to wake all male enuretics at 9 P.M., 12 midnight, 2 A.M., and 5 A.M., the child being made to get up and visit the closet. The percentage of cures in this group was somewhere in the neighbourhood of 30 to 40 per cent., while by the "team" method the results seemed slightly lower, although their assessment was more difficult. Dr. Hamill claims for his plan of putting the responsibility on the child that it greatly aids in the development of character, by encouraging the inhibition of impulses without conscious effort, while Dr. Wile says that the cured children in his series "reflect their new power in personality and in physical health, together with some intangible immeasurable advantages along the line of better emotional stability, greater intellectual application, and finer social balance." Such claims have never been made for the old-fashioned belladonna method, but the percentage of cures obtained was probably very much about the same.

THE IMMUNISING DOSE OF VACCINIA.

THE Rolleston Committee on Vaccination, in their report to the Ministry of Health last year, pointed out that definite experiments do not seem to have been made "to determine the minimal dose sufficient to give rise constantly in the human being to the characteristic vesicular manifestation and to immunity lasting for a reasonable time." In the light of their suggestion that "experimental observations be made to ascertain if it is feasible to increase the dilution of vaccine lymph beyond the present degree without impairing its efficiency," it is interesting to note some results obtained by Dr. Peter Clearkin,[1] of Tanganyika, in an investigation of vaccinal immunity in monkeys. He used a variolous strain obtained from a case of small-pox in 1920. Its virulence was maintained by alternate passage from calf to animal, and the titre was ascertained by the intradermal injection of 0·1 c.cm. of serial dilutions on the shaved abdomen of the monkey. The highest dilution causing vesiculation was taken as the titre, and the minimal infective dose was calculated from it. The immunity of the monkeys was tested, from 14 to 28 days later, by insertions of serial dilutions of a fresh, very active vaccine. The number of monkeys used was not large and the estimation of the minimal infective dose in this way is rough, but the experiments showed that very small quantities of vaccinia virus protect against enormous doses. The immunity given by 66 minimal doses was as strong as that given by 20,000, and protected against 50,000 minimal infective doses. In another experiment, two minimal infective doses protected against 100,000. Dr. Clearkin thinks that these results form a useful guide in the vaccination of human beings, since the dermal reactions of the monkey are very much the same as those of man. He points out, however, that the whole problem of anti-variolous immunisation is bound up with the production of a stable vaccinia virus.

OPHTHALMOSCOPIC SIGNS IN HEART DISEASE.

A PAPER by Wallan M. Yater and Henry P. Wagener, of the Mayo Institute[2] analyses the post-mortem findings in 137 cases of heart disease, in which the fundi had been examined ophthalmoscopically during life. The cases were classified first according to species of heart disease and secondly according to character of the changes observed in the fundus. The writers conclude that ophthalmoscopic examination yields negative results in heart disease unless this is due to or associated with hypertension, coronary sclerosis, or subacute bacterial endocarditis. Of the 137 cases, 8 had subacute bacterial endocarditis, death being due to septicæmia in all cases. Embolic lesions were noted in 2 cases. Thirty-two patients were classified under the heading of hypertension; of these, 25 died of cardiac decompensation with or without uræmia, 4 of hemiplegia, 2 after operations, and 1 after an accident. All but one out of the 32 showed sclerosis of the retinal arteries of "hypertension type"; by this the authors mean generalised constriction of the calibre of the arteries with exaggeration of the arterial reflex stripe, irregularities in the lumen of the arteries, and arterio-venous compression. In addition to these changes, 17 showed retinitis—i.e., scattered cotton-wool patches and hæmorrhages and œdema of the retina, occasionally even œdema of the disk. In three other cases there were hæmorrhages not severe enough to come under the term retinitis. In this series, therefore, very nearly all those cases of heart disease which were dependent on high blood pressure alone showed retinal changes. Among 25 cases in which coronary sclerosis was found, 19 deaths had been due to causes purely cardiac and six followed operations. In many of these cases, and also in 11 cases of mixed type, high blood pressure was present and fundus changes had been recorded. These changes were often merely indicative of what the authors term senile arterio-sclerosis—that is, only an alteration in the light reflex, difficult to diagnose without any marked constriction of the retinal veins or alterations in the calibre of the arteries. Leaving these mild cases aside, the investigation showed that out of the 137 cases under review 52 had been diagnosed as having retinal arterio-sclerosis of the more severe or unmistakable type with or without retinitis. Even more interesting is the observation, already recorded, that, in the 32 cases in which hypertension was the only cause of cardiac disease discovered, typical retinal changes had been present in 31.

[1] Brit. Jour. Exper. Path., August, 1929, p. 237.
[2] Amer. Jour. Med. Sci., July, 1929, p. 105.

DIABETIC COMA.

Dr. E. P. Joslin[1] does well to point out that although seven years have now passed since the discovery of insulin, diabetic coma goes on taking its toll. It is, as he says, high time that deaths from this cause became very rare, and the simple outline of treatment which he sets out would go far towards achieving this if it were generally carried out. The treatment of the emergency of coma should, he says, take precedence over everything else and as soon as the diagnosis has been made insulin should be injected subcutaneously every half hour in doses of from 10–40 units or more until returning consciousness, normal respiration, and decreasing glycosuria show that recovery is beginning. To meet dehydration, a quart of normal saline should be injected subcutaneously at once, because in coma it is dangerous to trust to retention and absorption of liquids by the mouth or rectum. Intravenous injections are satisfactory if given slowly to avoid distension of the heart. The circulation, he suggests, may be stimulated by caffeine sodiobenzoate in doses of grs. 7½ given if necessary four-hourly. The stomach should be gently washed out so that liquids will be retained, and fluid containing about 50 g. of carbohydrate should be given in the first 24 hours. A gradual return to simpler articles of regular diet may then be made, the dose of insulin being regulated by frequent urinary tests, at first every two hours and later every four or six hours. The dose of insulin should be15 units for a red reaction with Benedict's solution, 10 for a yellow, and 5 for a green, and no insulin is required if the urine is sugar-free.

Prevention, however, is better than treatment and the patient must be taught to avoid coma. He must never omit insulin, in Joslin's opinion, so long as

[1] Jour. Amer. Med. Assoc., 1929, xciii., 33.

there is sugar in his urine, and irrespective of the diet he is taking he must increase the dose if he has fever or an infection. This is an aspect of the subject lately treated of by Dr. R. Boulin,[2] who places infection in the first rank of causes predisposing to coma. The more impressive conditions such as pneumonia and gangrene are, of course, not likely to be overlooked, but sore-throats, influenza, boils, and small infected ulcers have an importance to the diabetic which is out of all proportion to their apparent gravity. Coma in a chronic diabetic accompanied by any of the above conditions does not react easily to insulin and the prognosis is correspondingly grave. Next to infection emphasis should be laid on fatigue, both physical and mental, whilst shock from trivial injuries, and intoxication by alcohol or anæsthetics are other important precipitants of coma. Error in the diabetic régime is another and better recognised factor, and in this connexion Boulin mentions especially excess of animal proteins. In some diabetics, he says, too much meat is a far greater danger than too much fat. Surgical intervention is an obvious risk; this should not, however, mean that its aid is withheld or even postponed, but only that due precautions are observed. Starvation he regards as a valuable weapon in the treatment of precomatose conditions. The argument that because in the normal subject it produces slight acidosis it is therefore likely to increase the acidosis of diabetes, he dismisses as unjustified by facts; many authorities have consistently used complete starvation to reduce acidosis and have found it quick and reliable. As regards diagnosis he lays stress on the gradual onset of mental and physical feebleness passing progressively into loss of consciousness. Coma never comes on unless there are large amounts of sugar, and acetone as shown by the ferric chloride test, in the urine; but it is impossible by urinary examination alone to estimate the degree of acidosis, for this will depend upon the extent to which the kidneys allow these bodies to pass. Other and well-known signs of coma are loss of appetite, diarrhœa, vomiting, and abdominal pain, whilst the association of slow and ample inspiration and forceful expiration with a smell of acetone in the breath is, of course, conspicuous evidence of its commencement.

THE TRANSFUSION OF IMMUNISED BLOOD.

WE may reasonably look on serotherapy as being still in its infancy. At birth it was the idol of all beholders; then it seemed to lose weight and popularity; and now once more it shows signs of being a credit to the family. Notable advances have been made of late years, for example, in the therapeutic use of convalescent serum in quite a number of diseases, such as poliomyelitis and measles. But obviously there are many difficulties in the way of getting suitable and sufficient serum from convalescent patients and the method has many limitations. The main effort is therefore concentrated on attempts to produce blood or serum with strongly antipathogenic properties. Theoretically, it should be possible to render whole human blood more potent in this respect than any animal serum, but in practice it has not proved very easy to do so. In applying the method to the treatment of acute illnesses most of those working along these lines have of necessity utilised non-specific transfusions, the donor of the blood being actively "immunised" by injection of an indifferent "antigen" such as nucleic acid or a stock vaccine. It is customary to take the blood within 24 hours—usually about six to eight hours after the inoculation—and give it at once to the patient. In less acute conditions there is, of course, time in which to try more specific immunisation of the donor, a procedure which ought to be free from risk if it is done carefully. Thus in treating enteric fever J. Clemens[3] gave injections of typhoid vaccine to the donors until the agglutination-titre of the serum had reached a high value, and carried out transfusion of blood to the patient without any danger or disadvantage to the donor. Greater difficulty is likely to arise with streptococcal infections in which immunisation is attempted by means of autogenous vaccines, and Clemens preferred to use blood taken from people who had recovered from septic wounds or erysipelas, seldom employing any preliminary inoculations to raise their immunity. The choice of donor depended on study of the bacterial flora of secretions from the wound and of organisms obtained from the patients' blood, and in the few cases he describes it appears that proven streptococcal septicæmia which had shown no improvement after frequent injections of streptococcal serum and other treatment were completely cured. It is to be regretted that fuller details of these cases are not recorded, but so far as they go they support the view that immunisation of a donor by autogenous streptococcal vaccines as a preliminary to blood transfusion might be carried out in such a way as to prove useful in such conditions as subacute malignant endocarditis. Some of the work done in this country has indicated that a similar course of treatment may prove of value in conditions of chronic toxæmia such as are sometimes present in rheumatoid arthritis or ulcerative colitis. With highly virulent organisms the process of immunisation is likely to take a considerable time, but in good hands it should certainly not be dangerous. In spite of the practical and theoretical obstacles which begin to crop up as soon as the subject is closely examined there are undoubted possibilities in this line of treatment, and it is not too much to hope that some of them may soon be realised.

[2] Rev. de Méd., 1929, No. 4, p. 431.
[3] Med. Klin., 1929, xxvi., 1021.

SPECIAL GLASS IN SCHOOL WINDOWS.

OPINION still differs about the value of having school-room windows made of glass which is pervious to ultra-violet rays. We know that ordinary glass cuts off most of these rays, including those of shortest wave-length which are said to be peculiarly beneficial to health; we also know that specially prepared glass will let such rays through; further, we may take it as proved that exposure to these short rays is often beneficial to weakly children. Here, then, is evidently a prima facie case for practical experiment, and such an experiment has now been made. In 1925 a test undertaken in a Smethwick school showed striking benefit to the health and nutrition of children who had their lessons in a class-room with windows of vita-glass, which is perhaps the best-known variety of special window glass of the kind under consideration. These results got a good deal of publicity, but it was felt that the small number of children (30) and the lack of adequate controls made their reliability doubtful. Therefore last year, at the instance of the Board of Education, a thorough investigation was made in which a large group of children (240 in all) was kept under more elaborate observation. In his annual report Dr. Paul, the school medical officer for Smethwick, records the method and results of this research. Two classes were selected in each of three different schools, great care being taken to ensure that each pair contained children of the same average age, $5\frac{1}{2}$, $8\frac{1}{2}$, and $10\frac{1}{2}$ respectively, of the same social status, and with similar school curriculum and environment. In each group one class was kept in a room with special windows, and for over a year from May, 1927, careful records were kept of the children's height and weight, and of their hæmoglobin index by von Fleischel's method, whilst educational tests were also systematically conducted. From the tables showing the figures at the beginning and end of the experiment, which are set out in the report, it appears that growth was in no way greater in the vita-glass classes than among the controls, whilst the educational tests had inconclusive results, the most favourable figures being spread fairly evenly over both sets of classes. The average attendances were also no better in the vita-glass classes. On the other hand, the hæmoglobin content figures were consistently better in the vita-

glass classes, the average increase for them being nearly 13, whereas in the control classes it was only about 7½. Critics familiar with the technique of von Fleischel's method might suggest that this difference is not significant, but in view of the scientific and judicial way in which the research was carried out, these figures must be taken to mean a real difference in favour of the special glass. On the whole, however, it is impossible to deny that the benefit to the school-children from the vita-glass windows was very slight, the reason probably being that children sitting upright in a class-room with their clothes on have very little of their skin exposed to the light. When, as in special establishments, they can be recumbent and unclothed with the light falling on them from above, the benefit is generally accepted as considerable, and the effect would doubtless also be more marked in places where there is clear air and much sunshine. The daily average of sunshine at Smethwick was only 2 hours 45 minutes, and for two hours (noon to 2 P.M.) of the sunniest part of the day the children were not in school. These factors would more or less hold good for English schools in general, and considering that vita-glass tends to lose its special penetrability with time and is a good deal more expensive than ordinary glass, it scarcely seems sound policy to reglaze all class-rooms. Certainly it would be undesirable to do so if such a step were thought a satisfactory alternative to the establishment of adequate open-air schools where sunlight can act under much more favourable conditions and in company with many other healthful influences.

A NEW VACCINATION ORDER.

THE Minister of Health has adopted the four first recommendations of the Committee appointed by his predecessor in 1926 to consider, inter alia, "the practical methods which are available in the light of modern knowledge to remove any risks which may result from vaccination." An Order issued this week gives effect to the change of policy, and an account of its provisions will be found on p. 411 of our present issue. It instructs public vaccinators to make single insertions of lymph instead of the four which were previously required; multiple insertions will be available for those who wish to gain maximal immunity at one operation. As a corollary to the smaller dosage the rule is altered by which the Ministry did not allow revaccination, by public vaccinators, below the age of 10. Revaccination will be encouraged at the age of entering school (5 to 7 years), and again on leaving (14 to 16). In a covering letter to local authorities the Minister emphasises the importance of primary vaccination in infancy. Recognising that "post-vaccinal nervous disease" has occurred mainly in children of school age or in adolescents who have never been vaccinated, he expresses the opinion that in the present state of knowledge, and so long as the small-pox prevalent in this country retains its mild character, it is not generally expedient to press for the vaccination of such persons unless they have been directly exposed to infection. The new Order makes no reference to the use of less potent lymph.

DRY LUMBAR PUNCTURE.

THE difficulties occasionally encountered in securing a sample of cerebro-spinal fluid, although the needle has been correctly passed, are examined by Dr. H. Carter in a short note contributed to the annual report of the Metropolitan Asylums Board for 1928 (p. 289). In the first place, he points out, the fluid may be pathologically thick or may be liable to clot in the needle. Secondly, there may for some reason be low local intrathecal fluid pressure. Neither of these explanations admits of much discussion. A third possible impediment—namely, lateral displacement of the theca by the needle—is set aside by Dr. Carter as improbable in view of the strong lateral and anterior attachment of the theca by the nerve roots and the common ligaments respectively. The fourth obstacle to drawing off fluid is usually described as the presence of nerve roots floating against the needle, but here again he finds the suggestion unacceptable, because the constituents of the cauda equina lack mobility. The fifth and newly recognised impediment, which he describes in the present note, is an abnormal persistence of three considerable masses of firm subarachnoid connective tissue in the theca. The chief masses are lateral and the small one is in the middle line. By the presence of these masses in the theca the cavity from which fluid is usually obtained may be reduced to one-third of its normal width. A needle is apt to be thrust into one of the lateral masses, and Dr. Carter suggests that in cases where "dry" lumbar puncture can be attributed to this cause the needle should be withdrawn and redirected so that it passes into the theca, not exactly in the middle line, but not far from it. The large lateral and small mesial masses should thus be avoided. The dissections on which the note is based were made on children, but it is possible that the abnormally persistent subarachnoid fibrous tissue may be found in a certain proportion of adults.

ON Tuesday evening, August 20th, the following bulletin was issued from Buckingham Palace:—

> The progress of His Majesty the King towards restoration of health continues. The wound is steadily diminishing in size, and is healing satisfactorily. His Majesty has derived benefit from breathing and other physical exercises. Both bodily and mental activity are now undertaken without undue fatigue. The King will be able to leave London for Sandringham in a few days.

This bulletin, which is the first to appear since July 3rd, was signed by Sir Stanley Hewett, Sir Hugh Rigby, and Lord Dawson.

MORE than 700 people have enrolled as members of the Thirteenth International Ophthalmological Congress which is to be held at Amsterdam and The Hague from Sept. 5th to 13th, and nearly 250 communications covering the branches of ophthalmology have been promised. The principal subjects of discussion will be the ætiology and non-operative treatment of glaucoma; the geographical distribution of, and international social campaign against, trachoma; and the diagnosis of suprasellar tumours. Committees will present reports on the examination of visual acuity, perimetry, the notation of the cylinder axis, the examination of light sense, the standardisation of the visual examination of railwaymen and others, and ophthalmological education. The representative of England on the International Ophthalmological Council is Mr. Leslie Paton, whilst the secretary is Dr. E. Marx, of Holland.

WE have to record the death of Dr. Fletcher Beach, consulting physician to the West End Hospital for Nervous Diseases, and at one time medical superintendent of Darenth Asylum, on August 18th, in his eighty-fifth year.

CENTRAL ASSOCIATION FOR MENTAL WELFARE.—The annual conference of this Association, which was held in London at the end of last April, was described in our columns on May 4th (p. 921 et seq.). A complete report of the proceedings has now been issued and can be obtained from the Central Association for Mental Welfare, 24, Buckingham Palace-road, London, S.W., price 3*s*. 6*d*. The conference met under the presidency of Sir Leslie Scott, M.P., and was attended by a large number of people specially interested in mental welfare and the effect of the Local Government Act, 1929, on the work of local authorities under the Mental Deficiency Acts. Among the papers read was one on the report of the special investigation carried out on behalf of the joint committee of the Board of Education and the Board of Control, contributed by Dr. A. F. Tredgold, and an address on the recommendations of that committee was given by Dr. R. H. Crowley, senior medical officer to the Board of Education.

The Clinical Interpretation of Aids to Diagnosis.

A Series of Special Articles contributed by Invitation.

XLI.—CHOLECYSTOGRAPHY.

THE object of cholecystography is to render the contents of the gall-bladder opaque to X rays so that its anatomical characteristics and physiological reactions may be studied. The normal gall-bladder is constantly receiving or discharging bile, and if a series of cholecystograms are taken at appropriate times this filling and emptying can be made visible.

Mechanism of the Test.

Broadly speaking, the mechanism of the test is as follows: A halogen compound, the one most frequently used being sodium tetraiodophenolphthalein, generally known as "the dye," is introduced into the body intravenously or by the mouth, according to the technique adopted. It is carried by the blood to the liver, through which it passes, leaving by way of the bile. In the gall-bladder the bile containing the dye is concentrated and so rendered opaque to X rays, and then after an interval is discharged down the common bile-duct. For a successful cholecystogram it is necessary to have (1) adequate absorption of the dye, (2) a permeable liver, (3) a patent cystic duct, (4) a gall-bladder able to concentrate its contents, (5) a patent common bile-duct. Full details of technique are given in recent medical text-books. Once a satisfactory technique has been arrived at, it should be scrupulously followed; in this way only is it possible to reduce mistakes to a minimum. At Ruthin Castle we get good results with a preparation known as keraphen (tetraiodophthalophenon), which has the advantage of producing small reactions. It is given orally and is not unpleasant to take.

A preliminary screening should never be omitted. With cholecystography a normal gall-bladder gives a shadow (see below), while a pathological one, into which no dye enters, may not be visible. As is well known some diseased gall-bladders also give a shadow at an ordinary screening, and if a little dye does enter such a gall-bladder during cholecystography, the shadow of the gall-bladder itself, reinforced by this small amount of dye, may give a total shadow closely resembling that seen in a normal cholecystogram.

Cholecystography gives anatomical information as to the shape, size, position, capacity, and mobility of the gall-bladder, but it is mainly a test of function and herein lies its greatest use. Pathological changes must be inferred for the most part from the disordered function and, with the important exception of stone, cannot be directly shown in the way that is possible with an opaque meal in ulcer or growth of the bowel. Even when stones are present the gall-bladder may empty and fill normally.

THE NORMAL GALL-BLADDER.

The shadow begins to appear about four hours after intravenous and 12 to 15 hours after oral administration. It gradually becomes denser and after reaching a maximum fades, shrinking at the same time. This reduction in size and density is greater after a meal is taken, especially one containing much fat. (Figs. 1 and 2.) The shadow as a rule is gone 20–24 hours after its first appearance. Such a sequence proves that the ducts from liver to gall-bladder are patent, that the gall-bladder wall is flexible and that its mucosa is healthy, and finally that the way is clear from gall-bladder to duodenum.

Anatomical Variations.

Shape and size.—The normal shadow has a smooth outline and is pear-shaped, oval or sometimes almost globular. Its size varies greatly and is much influenced by the time of the last meal.

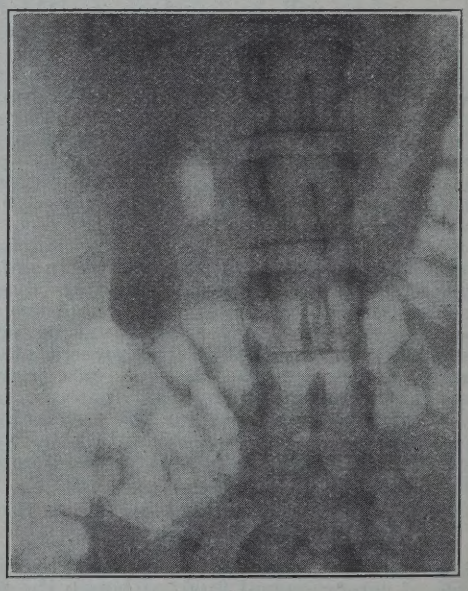
Position and mobility.—The position of the normal gall-bladder is also variable, as it may lie anywhere between the right costal margin and the right lumbar region, with almost as great a lateral swing. A range of three inches has been seen between the positions of the gall-bladder in the same patient standing and lying. This variability of position must be borne in mind, since a normally filling gall-bladder may lie in such a way as to be masked by the spine, or so that the tip of a transverse process may lie behind it and be mistaken for a stone within its lumen. The movement of the gall-bladder in various positions can be used in the differential diagnosis of opacities lying within the organ itself from those without. The anatomy of the gall-bladder also varies with the type of individual. The shadow is broader, placed higher, and moves more with respiration in those of massive build, heavy bony framework, short wide deep thorax, wide costal angle, and good bowel tone and position. In addition to general mobility within the abdomen, the range of movement in relation to neighbouring viscera is important. Here the radiologist is of great assistance by taking views from different angles, rotating or changing the orientation of patient to tube, and by the giving of a small barium meal when the gall-bladder is visible.

There are then wide variations of the normal gall-bladder, but for the most part they may be disregarded if a good shadow is obtained conforming to the emptying and filling changes noted above.

Significant Changes in the Normal Shadow.

The presence of a stone within the lumen may cause an abnormal outline and will be separately considered later. The hour-glass or biloculated gall-bladder, which is particularly liable to stone formation, may be congenital in origin or due to disease, such as adhesions, the presence of a large diverticulum, a tumour in the wall or pressure from without. My belief is that it is seldom congenital, and I would urge that a second cholecystogram should be taken before deciding that a gall-bladder is of the hour-glass type, for I have seen a bilocular shadow appear normal at a second examination. Double gall-bladders, gall-bladder diverticula, rudimentary gall-bladders, and those in which the fundus is bent up

FIG. 1.

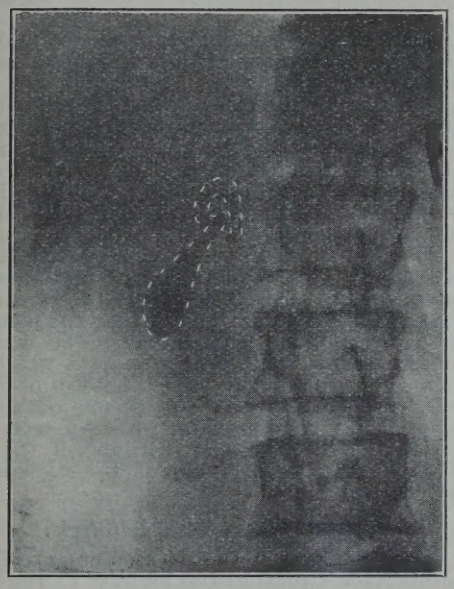


Normal shadow (oral cholecystography) filling stage.

so as to resemble a "Phrygian cap" are so rare as almost to rank as curiosities.

The normal gall-bladder should be more or less mobile, and one which does not show a fair range of movement should be regarded with suspicion, especially if highly placed, near the twelfth rib.

FIG. 2.



Normal shadow (oral cholecystography) after fat-containing meal.

A mottled shadow is generally due to stones, though it may be produced by gas in a superimposed duodenum or colon or by papillomata in the gall-bladder. When intestinal gas is present it is not confined to the gall-bladder region, and the shape of the bowel containing it can generally be made out. Multiple papillomata are rare; gritty stones lying free in the gall-bladder will change their position and arrangement with change of posture. If the stones contain enough calcium to render either periphery or centre opaque, the diagnosis is made more certain. A single stone adherent to the wall of the gall-bladder may cause an irregularity in the gall-bladder outline and be confused with an adhesion, a papilloma, or a lipoma

PATHOLOGICAL CONDITIONS.

From the standpoint of function the chief cholecystographic signs are the absence of a shadow of the gall-bladder, a faint shadow, the delayed appearance of shadow, and persistence of shadow. Of these the first two are the most important.

Absence of Shadow.

The absence of any shadow is the surest sign of a diseased gall-bladder. There may, however, even with a normal gall-bladder, be no shadow in extensive liver disease, catarrhal jaundice, acute abdominal conditions leading to temporary enlargement or œdema of the liver, and, as a rule, in the later months of pregnancy.

With these exceptions a failure to fill the gall-bladder may be regarded as due to (1) blocked cystic duct, stone being the most usual cause though growth and stricture are possibilities; (2) cholecystic disease so severe as to impair the concentrating power of the gall-bladder by destruction of mucous membrane or to fill it with calculi, mucus or inspissated bile; (3) blocked common duct due to stone or malignancy. In a series of 244 cases where no shadow appeared, which later came to operation, B. R. Kirklin[1] found a diseased gall-bladder with stones in 165, a diseased gall-bladder in 58, slight changes in the gall-bladder in 10, and a normal gall-bladder in 11, giving a total error of about 5 per cent. This raises the important and still unsettled point as to what constitutes a "diseased gall-bladder." The radiologist judges by cholecystography, which is a functional test, the surgeon by inspection and palpation, and the pathologist by the microscopic appearance of the organ. (The physician often has the unenviable task of trying to reconcile the opinions of his colleagues.)

If the 11 cases referred to above as normal gall-bladders had been removed it is more than probable that the pathologist would have supported the radiologist. I have seen a surgeon pass as normal a gall-bladder which had been condemned by the radiologist, and it was only when a "second look" was insisted on that the stones were detected which had been shown by cholecystography and were delivered when the organ was removed and opened. At present there are unfortunately no criteria applicable to all cases to indicate which is the gall-bladder whose removal will benefit the patient.

Faint Shadow. (Fig. 3.)

E. A. Graham, to whom the method of cholecystography is largely due, states of a faint shadow[2]—

> "This is but a degree of gall-bladder deficiency of which non-visualisation is the complete expression. . . . Ability to gauge the density of the gall-bladder image can only be gained by experience and observation. . . . There is no absolute scale of cholecystographic opacity because of the numerous variables that have their effect."

It is obvious that these "variables" should be reduced as far as possible by adhering closely to the

FIG. 3.

Faint shadow (oral cholecystography). Two negative shadows in gall-bladder (confirmed as stones at operation).

chosen technique. The causes of faint shadow are those outlined above, operating to a less degree or more intermittently. As is to be expected, the degree of accuracy is not so great as with "no shadow." In Kirklin's series of 141 cases of faint shadow, 81 showed stones, 40 a diseased gall-bladder, 4 slight changes in the gall-bladder, and 16 a normal gall-bladder, an error of about 11 per cent. Even this degree of error shows greater accuracy than is possible by other means of investigation, particularly when it is remembered that "faint shadow" occurs for

[1] B. R. Kirklin: Boston Med. and Surg. Jour., Feb. 9th, 1928, p. 1484.

[2] Diseases of the Gall-bladder and Bile-ducts. By E. A. Graham, W. H. Cole, G. H. Copher, and S. Moore. London, 1929.

the most part in the clinically suspicious or doubtful cases.

Other Variations.

Little is known about certain other variations from the normal seen in cholecystography. The late appearance of the shadow would be expected to follow delayed excretion of dye due to liver changes or a partial obstruction within the intra-hepatic duct system. In the gall-bladder itself a slow concentration owing to local disease would produce the same result. Even then should a shadow of normal density finally develop one should hesitate before diagnosing disease. When the shadow persists beyond the normal time the gall-bladder is rarely at fault, and other causes are to be sought, such as over-long abstention from food or reabsorption of the dye from the bowel.

Can a Diseased Gall-bladder give a Normal Shadow?

Here again we are faced with the unanswered question of what constitutes a diseased gall-bladder. In 121 cases which gave a negative response—i.e., normal shadow—Kirklin found at operation 4 cases of diseased gall-bladder with stone, 26 of a diseased gall-bladder, and 7 with slight changes in the gall-bladder, an error of about 30 per cent. He is supported by other observers, but Graham believes that "normal cholecystographic behaviour eliminates the biliary tract as the offender." My own experience is against such a definite statement. It is certain that the same gall-bladder may give a different response at different times owing to the presence of some temporary local condition at one examination. A repetition of the test is therefore advised in all doubtful cases. A professor of physiology was once asked as to what should be done when doctors differed. His reply was, "Call in more doctors." What, then, is to be done when doubt arises on the interpretation of a cholecystogram? Whether doubtful or not, it must take its place in a proper perspective with other data. Cholecystography is a test of function which may be capable of translation into terms of disease, but it cannot be allowed to replace the inferences drawn from a careful clinical examination. For example, recently in a case under our care, a bilocular gall-bladder filled and emptied normally. Operation was, however, advised on the history, when the suspected stone was found and removed, with cessation of symptoms. The history must be carefully taken and if necessary checked. This is instanced by the case of a jaundiced patient who denied all pain or even discomfort in the right upper quadrant of the abdomen. Despite this, surgery was advised, since stone was suspected. It was not till his operation, when 80 stones were found, that information was available from relatives of attacks of pain severe enough to require morphia.

Even when cholecystography indicates a diseased gall-bladder the case should be considered as a whole before treatment is decided upon. Cholecystitis is probably caused by a blood-borne infection, and there is a great possibility of disease elsewhere when the gall-bladder is involved. For this reason cholecystography should not be undertaken as a single line of investigation without due consideration of other organs. Thus, a man who showed a poorly-filling gall-bladder with multiple stones has been enabled to resume his work in comfort by clearing up a colitis which was evidently the main cause of his previous disability.

Summary.

In the presence of stone or gross gall-bladder disease cholecystography gives its most accurate results. It follows, then, that absence of shadow is the most reliable of purely cholecystographic signs and faint shadow comes next. In every instance the case must be considered as a whole before diagnosis and again before treatment. Cholecystography was devised as a test of function, and whilst it is a good servant may prove a bad master.

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Special Articles.

TREATMENT OF GENERAL PARALYSIS OF THE INSANE.

RESULTS OF MALARIAL THERAPY.

FROM the time when general paralysis was first recognised as a clinical entity the diagnosis has been regarded as almost equivalent to a sentence of death within four years. The recognition of its relationship with the *Spirochæta pallida* raised hopes doomed to early disappointment, for antisyphilitic remedies failed to give good results, and until Prof. Wagner-Jauregg introduced the malarial treatment no known form of therapy offered any prospect even of remission, much less of cure.

The Board of Control lost no time in starting an extensive test of the new remedy; they urged the superintendents of their institutions to try malarial therapy and instituted an inquiry into the results as soon as sufficient time had elapsed. The report of this inquiry is now available [1] in a form which constitutes a complete brochure on the subject of general paralysis. The history of the subject is outlined by Sir Hubert Bond in his preface, while Surgeon Rear-Admiral Meagher supplies an account of the work carried out in this country and in the various continental centres.

The Discovery of General Paralysis.

The historical introduction is a summary of Prof. G. M. Robertson's presidential address to the Royal Medico-Psychological Association in 1923. T. Claye Shaw has claimed that Shakespeare portrays a case of general paralysis in Achilles ("Troilus and Cressida," II., iii.), but the first account in medical literature was given in 1798 by John Haslam. The recognition as a clinical entity of what we call general paralysis is due to A. L. J. Bayle, who published his thesis in 1822 at the age of 23. During the two closing decades of last century the connexion of paralysis with syphilis was debated, but Sir Frederick Mott's appointment as pathologist to the London County Mental Hospitals marked an epoch in the history of the subject. His monumental volume, "Syphilis of the Nervous System," was published in 1910. The "parasyphilitic" doctrine was abandoned when Noguchi and Moore found the living spirochæte in the brain in 1913, and Mott was the first to admit that his hypothesis must give place to one which regarded general paralysis as "parenchymatous syphilis."

Malarial Treatment in this Country.

Dr. R. M. Clark, of Whittingham (Lancs), was the first English medical superintendent to induce malaria in general paralytic subjects; the date of the experiment was July 21st, 1922. In 1923 the City of London (Dartford), Rainhill, Hanwell, Bexley, Springfield (Middlesex), Claybury, Cardiff, Winwick, Chartham, Cane Hill, and Scalebor Park mental hospitals also adopted the treatment. Early in 1924 the Board of Control, assisted by Colonel S. P. James, I.M.S., of the Ministry of Health, issued a circular letter to all the institutions under their care, urging them to investigate the new remedy. Infected blood was supplied by Whittingham to other hospitals, and a mosquito centre was started at Horton. Statistics of all cases have been collected on an approved form from the outset, and Rear-Admiral Meagher, as well as collating these records, has personally visited as many of the discharged patients as possible.

To secure figures for comparison the report first reviews the fate of general paralytics in the 55 hospitals

[1] General Paralysis and its Treatment by Induced Malaria. Report by Surgeon Rear-Admiral E. T. Meagher, R.N. (Retd.) H.M. Stationery Office. 1929. Pp. 87. 2s.

where malarial treatment has not been introduced. After correction, the total number of cases admitted during the year 1923 was found to be 624. Of these, 560 (90 per cent.) were dead at the end of 1927, while 52 (8 per cent.) were still in hospital, and 12 (2 per cent.) were living at home. All but two of those still in hospital were in the last stages of the disease. The 12 outside an institution were visited, and all were found to be mentally abnormal. One was bedridden, dirty, deluded, and incoherent; three were childishly dependent and demented; one suffered from "neurasthenia," and another from varied subjective disabilities; one had done a little work but was always ill; one did a little supervised work, and two females were able to do a little housework in their own homes. None was capable of normal occupation. This series suggests very strongly that complete recovery must be extremely rare, and that the "natural remissions," to which improvement under malaria is sometimes ascribed, are of very brief duration and poor quality.

A similar investigation of the cases admitted during 1924 shows parallel results; 83 per cent. were dead, and 284 out of 549 (51·7 per cent.) had died within a year of admission. Nineteen out of every 20 general paralytics, once certified, remain in hospital until they die. Complete remission lasting as long as 12 months is most rare.

Results of Malarial Therapy.

Of 152 cases treated by malaria in 1923, no fewer than 36 were living at home, and 45 in hospital, while 71 had died by the end of 1927; thus 53 per cent. were alive, as against 10 per cent. of untreated cases. Of those still in hospital 7 had improved both mentally and physically, 7 mentally only, 5 physically only but without mental regression, while 18 had degenerated mentally. Six of the discharged cases could not be traced, but the others were visited, and 17 of them were at work earning wages, 3 were capable of work but unemployed, 3 females were successfully managing their homes, 2 were able to do odd jobs, and 5 only showed signs of dementia or degeneration. None was confined to bed or to the house. A similar series for 1924 showed that of 286 cases treated 120 were dead at the end of 1927, while 94 were in hospital (30 improved both mentally and physically, 4 mentally only, 16 improved physically without mental regression, and 24 degenerated mentally). Thirty-nine of the patients at home were earning wages, while 5 were temporarily out of work; 10 were performing their usual household duties, 4 did part-time work, and 4 were unemployed for physical reasons. Five only showed progressive degeneration, and none was confined to bed.

These figures have been compiled with the utmost regard for accuracy and may be accepted without hesitation. The report goes on to consider the possible fallacies introduced by diagnosis and selection of cases. There is, however, no disparity in accuracy of diagnosis between the treated and the untreated groups, so that the comparison stands, and any selection of cases seems to have erred rather on the side of liberality than of exclusiveness. The unavoidable conclusion is that patients treated by malaria have longer lives and lead a more desirable existence than untreated cases. If they eventually die their bedridden stage is shorter, and the nursing staffs declare unhesitatingly in favour of malarial therapy. Of the 108 discharged cases visited, 77 were found following their previous employments, which included surveying, shorthand typing, motor-driving, shopkeeping, mill work, and farming. Naturally, they had passed through a grave illness from which some permanent damage might be expected, but many of them were able to do laborious work and live reasonably normal lives among their relatives and neighbours. The impression received from a second group was that treatment had retarded rather than eliminated the disease; their horizon seemed a little limited, and their mentality a little dull, but their friends denied any increasing childishness. When marital life had been resumed the relationship seemed to be normal and the children healthy.

Cases treated during 1925, 1926, and 1927 are reviewed, and, although too recent to justify conclusions, they bear out those for 1923 and 1924. Of a total of 1597 cases treated in the five years, 33·9 per cent. are dead, 40·8 per cent. in hospital, and 25·3 per cent. alive at home.

Precautions and Conclusions.

The prognosis in untreated cases would justify a grave risk in treatment; the report discusses the deaths which have followed inoculation and which may be ascribed to malaria, and points out that the period of treatment is a perilous time requiring careful nursing and control by quinine. Once the patient has survived the fever the chances are good. It is not yet possible to state definitely which method of inducing malaria is the better. Relapses are frequent (about 50 per cent.) after mosquito bite, but rare after malarial blood (2 per cent.), but they usually remit spontaneously. Wagner-Jauregg has eliminated malarial deaths by careful preliminary cardiac treatment and quinine control, and his technique may prove equally successful if introduced here. The earlier malaria is given the more favourable is the outlook, and the report emphasises the urgent need for earlier diagnosis and earlier treatment. For the best results discharged cases must be followed up and supplemental treatment supplied. With these qualifications the malarial treatment can unquestionably be accepted as a therapy of proved value and great hope. To quote the report: "In applying malaria to general paralysis, Wagner-Jauregg has found a key that moves the lock."

MEDICINE AND THE LAW.

The Liability to Give Evidence.

THE liability of a medical witness to give evidence in the county court, and the limited remuneration which he may expect for so doing, were emphasised in the Bath county court last week when his honour Judge Gwynne-James inflicted a fine of two guineas upon a practitioner who had failed to answer a subpœna to attend the court and produce the medical record of one of his patients. The judge remarked that in two recent cases he had become aware of the existence of misunderstanding upon the subject. On each occasion a medical practitioner had refused to give evidence on behalf of a patient unless paid a special fee; in one instance the special fee demanded was 20 guineas, in the other a smaller amount. Such demands, said the judge, are of no avail and cannot be enforced. If a litigant desires the presence in court of a medical or other witness, all he need do is to serve him with a subpœna together with proper conduct money. The conduct money represents the travelling expenses, if any, to and from the court; "in the case of an ordinary medical witness" there is "an extra payment of one guinea which may, in an exceptional case, be increased not beyond five guineas." When this step has been taken, the witness is obliged to appear in court and obey his subpœna. He can demand no special fee, and, if he fails to appear, he is liable for contempt of court to a fine and imprisonment.

With this statement of the law, from one of the most senior and experienced of our county court judges, there is no quarrel. The medical practitioner has his duties to perform towards the administration of justice like any other citizen, though to hang about a county court all day long may cause him inconvenience, annoyance, and definite financial loss. The position is governed by Order LIII. of the County Court Rules and the official scales of fees which, within a certain not very liberal maximum, vary with the importance of the case and the discretion of

the registrar or judge. If the witness fails to attend, or, being in court, refuses to give evidence, he may be called upon to show cause why a fine should not be imposed upon him, and may then be fined if his explanation is inadequate. Possibly, if his absence was due to a summons in emergency to save life, the judge would accept it; in the recent case at Bath the absent witness had no definite reason to give; all he could say was that he had never had a subpœna before, did not appreciate what it meant, took the opinion of a friend, and absented himself. The judge accepted this frank statement as mere want of thought rather than deliberate affront to the court. As is explained in "The Conduct of Medical Practice," in criminal cases, a witness who disobeys a subpœna is liable to arrest and imprisonment. In civil cases he may be fined, and also conceivably he may be made liable in damages if the litigant can show that the case was lost for lack of the evidence which the absent witness would have given. Attendance in court, in fact, is an unfortunate necessity and the practitioner who seeks to avoid it must foresee the possibility of litigation and do his best to stand aside at the beginning—a course which his patient's interests do not always permit. As "The Conduct of Medical Practice" points out, it is sometimes possible to make a bargain beforehand with the party concerned and thus to stipulate for a special fee; if so, this is best done before disclosing any report or memorandum of the nature of the evidence that the witness will give; for, once the litigant knows what the witness will say, he can serve his subpœna and procure the attendance in the ordinary way. It remains only to add that more and more work is constantly being placed on the shoulders of the county court judges, and that attendance in the county court may become a more frequent duty for professional witnesses. The main justification of the county court as a tribunal is—next to its speed of decision—its cheapness. It follows that county court proceedings will seldom permit the payment of substantial fees.

BERLIN.

(FROM OUR OWN CORRESPONDENT.)

Amalgamation of Medical Associations.

THE annual meetings of the Hartmann-Bund and of the Ärzte-Vereinsbund were held this year in Essen. The result of these meetings was that the by-laws of both associations were amended with a view to the closer coöperation of the two associations. The Hartmann-Bund was founded some 20 years ago by the late Dr. Hartmann, of Leipzig, on the model of a trade-union, and was at first in opposition to the old established Ärzte-Vereinsbund, which was said to be not sufficiently energetic in the struggle with the sick clubs. By and by, however, the competition between both associations ceased, and notwithstanding their difference in organisation the work was divided between them; the Hartmann-Bund looked after the economic interests of the profession, whilst the Ärzte-Vereinsbund dealt with general questions such as medical ethics, medical study, and hospital questions. At the Essen meeting a thorough reorganisation was effected. While Leipzig continues to be the seat of the Hartmann-Bund, the provision that the committee must consist exclusively of Leipzig medical men is repealed as being no longer in accordance with the extension of the work of the Hartmann-Bund. It has been arranged that the president of this organisation shall ex-officio sit on the board of the Ärzte-Vereinsbund and vice versa. The situation has been still more simplified by the election of Dr. Stauder, of Nuremberg, as president of both associations. A resolution was passed against the trade tax being extended to the medical profession and against a wider application of compulsory sickness and invalidity insurance. Dr. Hellpach proposed that State insurance should be compulsory for persons earning less than 3000 M. a year, and voluntary for those earning 3000 to 6000 M., while people earning more than 6000 M. should be excluded from State insurance. Finally, the hospital question was discussed. It was stated that the number of hospital beds has increased by 71 per cent. since 1913, notwithstanding the decrease of the population by the loss of German territory after the war. In cases of illness the public more and more prefer hospital treatment to home treatment; nevertheless, private hospitals, the majority of which belong to religious corporations, cannot be maintained owing to their cost, and must be taken over by the municipalities where they are supported by public means. A motion was adopted that the appointments of hospital physicians or surgeons should not be influenced by the politics of the candidates.

Dietary Treatment of Tuberculosis.

The Berlin Medical Society lately discussed a new treatment of external tuberculosis devised by a medical man, Dr. Gerson, of Bielefeld, Westphalia. The discussion was introduced by Prof. Sauerbruch, who said that in his clinic in Munich, where he was professor of surgery until his recent appointment to the chair of surgery at Berlin University, he had made experiments on the influence of diet on the healing of wounds and of external tuberculosis. By chance he heard of a Bielefeld medical man curing tuberculosis by a special diet, and thereupon he sent his assistant, Dr. Hermannsdörfer, to that city to study the method. Dr. Hermannsdörfer, in his paper read before the Medical Society, said that the new diet was based on the following facts. Experiments on animals had proved that a protein diet reduced susceptibility to infectious diseases, whilst carbohydrates favoured tuberculosis. The liability of the body to infectious diseases depended on the amount of water in the tissues, and the limitation of kitchen salt made the tissues drier. By administration of vitamins the liability to infectious diseases could be decreased. Dr. Hermannsdörfer therefore prescribed for tuberculous patients protein and fat with a small amount of carbohydrates, and replaced kitchen salt by a salt which Dr. Gerson called mineralogen, consisting of potassium and magnesium. He further prescribed much salad and vegetables in a raw state; the quantity of grilled and boiled meat was limited. The cost of such food was 50 per cent. higher than that of the ordinary hospital diet, but the results were extraordinary. Tuberculous lesions of the bones and joints and fistulæ healed; in lupus healing was obtained within a few weeks or months, and the results were permanent, even when the diet had been discontinued. As regards tuberculosis of the lungs, a definite judgment cannot yet be given, but it is reported that Dr. Rollier has introduced the above diet in his well-known sanatorium in Leysin, Switzerland. Dr. Bommer, of Giessen University, stated that the method had been applied in the University Clinic in 200 cases of lupus with excellent success. A great sanatorium is to be opened in Wilhelmshöhe, near Cassel, for the treatment of tuberculosis according to Dr. Gerson's method and under his direction.

Country Practice in Eastern Prussia.

A correspondent to the *Berliner Ärzte-Correspondenz* gives an interesting description of the position of country practitioners in Eastern Prussia, the part of Germany beyond the Polish Corridor. Eastern Prussia is the most lonely region of Germany, the population consisting for the greater part of peasants and large landowners. Cities are rare, and a town of 30,000 inhabitants is regarded as an important city. The railway lines are few and far between, and sometimes many miles from the doctor's residence, and the traffic is small. After the war, when many newly qualified medical men returned to Germany, there was a great movement towards the country, as the towns at that time were already overcrowded with medical men. This movement has now completely

stopped and many country practitioners try to go to the towns. There are several reasons: first, the deficiency of dwellings. The country medical man has no chances of diversion outside his home, and when his surroundings are not pleasant he tries to get away as soon as possible. In some places where the local authority has provided for adequate residence for the medical man and has let it to him at moderate prices, the result is that those posts were much sought after. Another reason is that in Eastern Prussia the income of the country practitioner is too small, a practice of 8000 M. being, as a rule, the maximum income. In some particularly lonely places, where no medical man would voluntarily settle, the Treasury has given an extra allowance of 3000 M. for a resident doctor, but this sum is too small to attract medical men because private and club practice in those deserted places is quite insignificant. A medical man who, as an exception, earns as much as 10,000 M., is not in a position to have holidays, a locum tenent for a month costing 1000 M. A motor-car, which is indispensable owing to the great distances, may be purchased by the instalment plan, but as a rule the medical man has not the means to buy another car when the old one is worn out. In Königsberg, the capital of Eastern Prussia, the local group of the Hartmann-Bund has appealed to the Königsberg medical men not yet admitted to club practice to settle in country places, but there has been no response to that appeal.

UNITED STATES OF AMERICA.

(FROM AN OCCASIONAL CORRESPONDENT.)

The International Physiological Congress.

THE International Physiological Congress is meeting from August 19th to 23rd for the first time on American soil. This is the thirteenth of these gatherings, of which the first was held at Basle in 1889, as the outcome of suggestions which found expression at the International Medical Congress in London in 1881. Since the war meetings have been held at Paris in 1920, at Edinburgh in 1923 (when German physiologists once more attended), and in Stockholm in 1926. The meeting this summer is to be held at the Harvard Medical School under the presidency of Dr. William H. Howell, director of the School of Hygiene of Johns Hopkins University.

Effects of Carbon Monoxide in Low Concentration.

When the Holland tunnel was being built in New York it became necessary to find out how much carbon monoxide is permissible in tunnel air. The research done at that time [1] has become a standard in this country for ventilating engineering, but it took account of tunnel ventilation rather from the point of view of the driver of an automobile exposed for a relatively short time than of the worker—e.g., traffic policeman or repair shop employee—who may be exposed for several hours, and members of the U.S. Public Health Service now describe [2] an investigation of effects on this latter class of worker. Exposures were made in a special chamber from four to seven hours daily over a period of 68 days to gasoline engine exhaust gas so adjusted that the mixture breathed contained at the will of the experimenters 2, 3, or 4 parts of carbon monoxide per 10,000 parts of air. Six men were subjects of the experiments. Exposure to 2 parts carbon monoxide per 10,000 air gave distinct frontal headaches in from 3½ to 4 hours in about half the exposures. No occipital headaches resulted from exposure to this concentration. In a concentration of 3 parts per 10,000 of air frontal headaches appeared sooner (2½ to 3 hours), and a few cases of occipital headache and of vertigo occurred after three hours. This concentration produced 20 per cent. carboxyhæmoglobin in the blood in 2½ to 3½ hours, and 30 per cent. in 4 to 5½ hours, depending on the subject and whether he was at rest or exercise. At the higher concentration of 4 parts per 10,000 parts of air the above effects were more rapidly induced. At the end of 3½ to 4 hours more than 90 per cent. of exposures resulted in frontal headaches. In general, frontal headaches appeared when the hæmoglobin was about 20 per cent. saturated. A few distinct occipital headaches accompanied by vertigo developed at 23 to 28 per cent. saturation. When the subject was breathing uncontaminated air, saturation of hæmoglobin was reduced from 35 per cent. to 5 per cent. in five hours. Inhalation of oxygen greatly increased the speed of desaturation—from 35 per cent. to less than 10 per cent. in 30 minutes. There were no apparent signs that the health of the test subjects was adversely affected by the experiments. Hæmoglobin was usually increased pari passu with an increase in the red cell count. The leucocytes were unaffected. Apart from the occasional appearance of sugar nothing abnormal was found in the urine. Significant results were not obtained by psychological tests, possibly because so few men were under observation.

[1] Ventilation of Vehicular Tunnels. U.S. Bureau of Mines, 1927.

[2] Effect of Repeated Daily Exposure of Several Hours to Small Amounts of Automobile Exhaust Gas. Public Health Bulletin, No. 186. 1929.

Medicinal Whisky.

Although there has been a slight decrease in the average amount of liquor prescribed by each physician the number of doctors prescribing alcohol continues to show a steady increase, having risen from 48,097 on June 30th, 1927, to 69,645 on the same date this year. The amount of whisky prescribed and consumed for medicinal purposes has been somewhat over 6,000,000 gallons in the last four years. There remain some 9,000,000 gallons mostly distilled before 1917. This stock, being sufficient only for four or five more years, the Prohibition Commissioner has authorised the manufacture next year of 2,000,000 gallons of medicinal liquor to replenish the supply.

BUCHAREST.

(FROM OUR OWN CORRESPONDENT.)

Relative Intelligence of the Sexes.

Dr. Petrescu lately read a paper before the Pedagogic Society, giving the results of 15 years' observation in the schools of Bucharest. He has found that intelligence is about equal in the two sexes in the earliest school years. The subsequent increase in mental power is considerably more rapid among the girls, so that at the end of the school period the results of intelligence tests are all in favour of the female sex. His conclusion is that the female intellect develops more rapidly than the male, and in this he agrees with the experience of de Körössy in Hungary. But he points out that as the great work of human progress has been accomplished by males, it is fair to assume that there is an early turning point at which the intellectual activity of women is arrested.

The Katzenstein Method of Testing the Heart.

In a communication recently presented to the Medical Society of Jassy Dr. Constantinescu spoke of Katzenstein's method of determining the functional power of the heart—a method which holds to be of especial service before surgical operation. It is based on the observation in animals that ligature of the larger arteries results in an increased cardiac activity which is characterised by higher blood pressure without any change in the pulse-rate. This condition does not disappear until the collateral circulation is fully established after a period of several weeks. In practice the test is performed as follows. The patient lies down, and when he is quite quiet the pulse-rate and blood pressure are determined. Both iliac and femoral arteries are then compressed, and the

pressure is kept up for two to five minutes, changes in blood pressure and pulse-rate at the end of that time being carefully noted. With a healthy heart acting normally there is a rise of from 5 to 15 mm. of mercury in the blood pressure, while the pulse-rate remains the same or is slightly diminished. With a hypertrophied heart a rise of from 15 to 40 mm. is observed, and the pulse remains the same or is increased. With slight cardiac insufficiency the blood pressure does not rise, and the pulse-rate is unchanged or increased; whilst a marked insufficiency shows itself by a reduction of blood pressure and an increase in the pulse-rate. The method has the advantage of being simply and easily applied, but it is necessary to guard against excitement which might affect the result.

Multiple Arterial Thrombi.

In a recent paper in *Praxis Medici* Dr. I. Sturza criticises the common diagnosis of embolism where occlusion of large vessels and sudden death occur in patients suffering from mitral lesions. He is inclined to view the process as thrombotic, on the ground that the large masses found on the vessels are often altogether out of proportion to the small and delicate excrescences upon the diseased valves. Even if thrombi are present in the left auricle, their smooth surface argues against the possibility of embolism. In a case recently under his observation the abdominal aorta from 10 cm. above the bifurcation, together with the left and right femorals, the superior mesenteric, the left renal, splenic, right pulmonary, left inferior thyroid and left carotid arteries were found filled with clot. The immediate cause of death was occlusion of the mesenteric artery, and though the patient died half an hour after the accident, the intestines were already the seat of a hæmorrhagic infarction and peritonitis was beginning. The autopsy was performed four hours after death. To decide the question of thrombosis or embolism, the walls of the affected vessels were examined microscopically and intense inflammation was discovered in them, probably set up by the cntrance of bacteria into the vasa vasorum, incident to a recurring endocarditis. On this explanation, he holds, it is not difficult to understand that a thrombosis may set in as suddenly and with the same signs as an embolism. The number of vessels occluded is often surprising, but the patients may have relatively few symptoms.

Public Health Services.

REPORTS OF SCHOOL MEDICAL OFFICERS.

Name of district.	No. on roll.	Average elementary school attendance.	No. of routine children examined.	No. of special examinations and re-inspections.	Percentage of children found on routine examination requiring treatment.†
Bootle ..	11,807	10,613	3,631	14,578	22·4
Leeds ..	75,150	—*	21,817	77,569	32·7
Stockport ..	15,227	13,447	5,458	12,388	23·63
Margate ..	3,337	2,944	1,152	1,376	15·7
Ilford ..	14,910	—*	5,910	9,795	28·6

* Not given. † Excluding dental defects and uncleanliness.

Bootle.

Dr. F. T. H. Wood, of Bootle, calls attention to the progress and expansion of the school work made possible by the increasing interest and coöperation of parents and teachers. Special inspections have risen from 4790 to 5280, largely owing to the attendances at the rheumatism clinic established early in the year; over 60 per cent. of the sources of reference at the special inspections were direct requests from the parents. Dr. Wood stresses the value of the attendance of parents at the routine inspections. He believes that the education of parents in sound nutrition and domestic care, the improvement of facilities for the drying of clothing of children arriving wet at school, the provision of dry dwellings, and prompt early attention to chills and illness such as tonsillitis will all play an important part in the conquest of rheumatism. He notes that 84 per cent. of all the skin diseases were due to conditions closely associated with uncleanliness and that nearly 3000 school days were lost by exclusion indirectly due to the same cause; the annual cost to the ratepayers of the inspection and treatment of uncleanliness in school-children was at least £300. He is convinced that the source of infection of all habitually verminous children is the home and not the school, and that if further progress is to be made it must be through education of the parent. On the subject of dental treatment he holds that the surprising difference in the conditions of the children's teeth and in the number of consents given for treatment among schools of similar standing can only be explained by the varying degrees of interest and enthusiasm shown by teachers, who are also urged to devote attention to the prevention of flat-foot, which mostly begins in later childhood. He draws attention to the importance in this connexion of (1) avoidance of muscular fatigue in the growing child and provision for ample sleep; (2) supervised training of the whole muscular system, especially that of the legs; (3) ordering a proper type of boot, which should be so fashioned that the inner side of the boot is kept straight and the end of the boot opposite the big toe; and (4) teaching the child to walk and stand with feet kept parallel and not pointed outwards. In walking the child should rise on the balls of the toes with each foot in succession.

Dr. A. G. Williamson, the assistant medical officer, analyses 111 of the first cases of rheumatism seen at the clinic. He states that no new features have come to light. The great majority of the cases started between the ages of 5–12, and that as the heart was so often affected in insidious and unsuspected cases the value of the clinic was emphasised. The spread of scalp ringworm was also inquired into, and in the 18 cases closely investigated the infection was not of school origin—a feature that is in harmony with the keynote of Dr. Wood's report, that the most important influence on the child is to be found in the home.

Leeds.

Dr. A. Wear notes the changes in the 20 years since the first report on the school medical work was issued; the work in general has increased in extent and efficiency, while the special work has come to include orthopædic treatment with massage and artificial sunlight, X rays, clinics for ear, nose and throat, eyes and skin, and searching ascertainment, registration, and administrative action for exceptional children. The clinic work began in one top room with one nurse (Miss Webster), who to-day superintends the school nursing service of Leeds (covering nearly 320,000 patients every year), of which she was once the sole representative. Owing to the indefatigable work of the nurses, with the help of the teachers, the presence of lice and nits, almost inevitably found in these early days, has become "distinctly rare." There is now a generally improved physique and more careful dental and general cleanliness, and the establishment of a health conscience, particularly among the girls, is becoming noticeable. On the value of fresh air in elementary schools Dr. Wear is emphatic. He cites two otherwise similar schools; one with better ventilation had a percentage of 6·5 cases of infectious illness, another less well ventilated had a percentage of 13·7. It is surprising that the report contains no direct

reference to the lack of an open-air school. This lack is the more striking because the percentage of defects found is unusually high (32·7 per cent.) which reflects both thorough medical inspection and adverse local conditions. There may be some local factor which explains this omission, nowadays very rare. Provision seems to be made for all exceptional children apart from the delicate and pre-tuberculous class, and it is especially this class which benefits so much from prophylactic treatment. There are special schools for the physically and mentally defective, for the blind and the deaf, and there is a nursery school. For anæmia, rickets, malnutrition, and tuberculous conditions artificial sunlight treatment has been available since June, 1927, and recently these facilities have been improved. Dr. Wear comments on the low earning capacity of the ex-pupils of the special mental deficiency schools, and thinks that more attention should be given to manual training, and he also suggests that a larger proportion of scholars might be allowed to leave school for *suitable* employment after reaching the age of 14. But would not, however, this system defeat its own object? The child leaving at 14 usually gets into a blind alley job from which he is turned away at 16 when his employer is faced with payments under the Insurance Act. He is then workless, untrained, and unsocialised, and for the defective lad the moral and social outlooks are deplorable. If this possibility were borne in mind in the interpretation of the phrase suitable employment this danger might be avoided, but the number of children finding permanent work would be small. Improvement is to be hoped for along the other lines indicated in this report—better manual (semi-vocational) training continued until 16 years of age, and close coöperation with the employment exchanges.

Despite the immense amount of routine work time has been found for some special inquiries, and for propaganda in the best sense of that word—including the award of prizes for the child with the best cared-for teeth and for the best essays on the subject.

Stockport.

Dr. N. Gebbie draws attention to the fact that in Stockport, as elsewhere, the number of children found to be suffering from defects at the very beginning of their school life is still unduly high, and suggests that it is to a more complete supervision of the infant and the toddler by means of an extended maternity and child welfare service that we must look for improvement. This conclusion is not altered by the circumstance that the percentage of defects at later ages does not differ greatly from that of the entrants, for many defects may persist and others are revealed—e.g., errors of refraction—as school life progresses. But the care of the toddler is not so much in the province of the infant welfare centre as in that of nursery schools, the universal and adequate provision of which is an ideal not yet likely to be attained. They do not exist in Stockport, and it is not indicated in the report how far the facilities of the school clinics are made use of for infants below school age. A considerable extension of the dental work has been made possible by the appointment of an additional dentist in August, 1928. There have been inspections in 20 schools, compared with six in the previous year. Steps have also been taken to reduce the number of casual cases, though six sessions per week out of 24 are reserved for treatment of urgent necessitous cases. A complete orthopædic scheme has not yet been established, but good work is being done by means of a special arrangement with the Stockport Infirmary, and the interest taken in the welfare of the crippled children by Mr. E. S. Brentnall, the hon. orthopædic surgeon of the infirmary. The facilities provided include massage, exercises, and artificial sunlight treatment. Some beds are allotted at the infirmary to school-children, and cases are also sent to the Shropshire Orthopædic Hospital at Oswestry. It has been decided to provide an open-air school at Woodbank, where there is an ideal site, with accommodation on modern lines for approximately 100 children. Three class-rooms of the open-air type are in use in a temporary building at Flyde Lodge High School. A voluntary organisation known as the "George Fearn Trust," aided by a grant of £150 from the local authority, maintains 15 beds at the Ormerod Convalescent Home at St. Anne's-on-the Sea. There is no organiser of physical training, but in the elementary schools this training is given by teachers who have paid special attention to the subject, and in the secondary schools for girls remedial exercises when required are discussed by the visiting doctor with the drill instructor. Owing to the prolonged illness of the specialist teacher the class for stammering children could not be held. It is evident that the work in Stockport, as far as the facilities allow, has been thoroughly carried out.

Margate.

Margate is one of those smaller places where practically all the general work is done by one person. Dr. Cowan McCombe has to turn his mind from large engineering questions like main water-supply to smaller ones like the cure of blepharitis or the giving of an anæsthetic, and constantly has new duties to face such as the care of rheumatic children and the licensing of nursing homes. He has help in the special branches of dental, aural, and ophthalmic work, and his burden is lightened by the nurse (there is apparently only one full-time nurse) and by the sanitary inspectors. He has also the coöperation of the attendance officer and the teachers, to all of whom he gives especial thanks. It is perhaps because Dr. McCombe is known so well personally that the percentage of parents attending the medical inspections is unusually high—nearly 80 per cent. Another feature of a small area with good local interest is the large share taken by voluntary bodies; the provision of meals for necessitous cases is carried out independently of the authority, and the occupation class for the ineducable mentally defective was run privately. The risk attached to such voluntary service was made obvious when the lady responsible for this class was unable to continue and it had to be dropped at least temporarily. This is the more unfortunate because there is no home for mentally defective children in Kent, and it is almost impossible to get institution treatment for them. Another disadvantage of areas of this size is the impossibility of establishing any local special schools; use has to be made of joint or borrowed accommodation. The education authority has recently coöperated with the county council in the orthopædic scheme. The clinic is held at Broadstairs, where an orthopædic surgeon attends twice a month and a trained nurse weekly. Hospital accommodation is provided in suitable cases and surgical appliances are supplied for out-patients when necessary. There are 65 delicate children who would benefit from an open-air school, but this, unfortunately, does not exist.

Ilford.

Dr. A. H. G. Burton, whose school medical report was again one of the earliest to appear, shows clearly what has been done in Ilford and what extensions of activity are essential. The authority has established an adequate and well-planned open-air school to which 90 children have already been admitted. It is designed to allow the maximum amount of sunlight and air into the class-room, the whole of which can be opened on the south side by folding doors. Arrangements have been made for the conveyance of those who live in outlying parts of the borough. The next step forward will be the establishment of an orthopædic scheme, which is not a very easy matter owing to the position and size of Ilford. Coöperation with the Essex County Council has been considered, but the nearest centre is at Romford which is too far for Ilford children to attend. The nearest hospital at which there is an orthopædic surgeon is in London. The authority would therefore

need (1) to make arrangements for in-patient orthopædic treatment in London; (2) to appoint an orthopædic surgeon whose salary would be some 80 guineas a year if he attended fortnightly; and (3) to establish and fit up clinics for massage and remedial exercises with a whole-time trained masseuse at a salary of £200. At present valuable remedial exercises are being carried out for postural defects and slight deformities by Mr. F. T. Roberts, the supervisor of physical training, whose interesting report is here included. Extended facilities for dentistry are much needed. The present scope of the work is very limited, and the low percentage of acceptances (45·9 per cent.) should be raised when the appointment of a second dentist makes it possible to undertake educational propaganda among the parents and children.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED AUGUST 10TH, 1929.

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 114 (last week 129); scarlet fever, 1482 (last week 1776); diphtheria, 741; enteric fever, 80; pneumonia, 612; puerperal fever, 28; puerperal pyrexia, 81; cerebro-spinal fever, 8; acute poliomyelitis, 16; acute polio-encephalitis, 2; encephalitis lethargica, 14; continued fever, 1; dysentery, 16; and ophthalmia neonatorum, 81. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the Metropolitan Asylums Board on August 13th–14th was as follows: Small-pox, 132 under treatment, 5 under observation (last week 134 and 9 respectively); scarlet fever, 1326; diphtheria, 1491; enteric fever, 13; measles, 330; whooping-cough, 276; puerperal fever, 27 (plus 13 babies); encephalitis lethargica, 123; and "other diseases," 23. At St. Margaret's Hospital there were 12 babies (plus six mothers) with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns, including London, there were no deaths from small-pox, 3 (1) from enteric fever, 28 (5) from measles, 1 (0) from scarlet fever, 25 (6) from whooping-cough, 33 (6) from diphtheria, 60 (5) from diarrhœa and enteritis under two years, and 15 (4) from influenza. The figures in parentheses are those for London itself.

Of the deaths from measles 5 were reported from Liverpool and 5 from Bradford; those from diarrhœa and enteritis included 6 each from Manchester and Liverpool, 5 each from Birmingham and Sunderland, 4 each from Hull and Stoke-on-Trent, and 3 each from Leeds and Newcastle-on-Tyne.

The number of stillbirths notified during the week was 305 (corresponding to a rate of 49 per 1000 total births), including 59 in London.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.—From Sept. 9th to 14th the Brompton Hospital will hold an all-day course in diseases of chest. Facilities will be given for attending the practice of the various departments of the hospital, and instruction will be by lecture and demonstration. Under Dr. Eric Pritchard's direction there will be a course at the Infants Hospital from Sept. 9th to 22nd. This is designed mainly for those engaged in infant welfare work, and visits will be paid to centres other than the hospital. From Sept. 10th to Oct. 5th a course of lecture-demonstrations in psychological medicine will be given at the Bethlem Royal Hospital on Tuesday and Saturday mornings. An intensive course in medicine, surgery, and the specialties for men only will be given at the Westminster Hospital from Sept. 16th to 28th, from 10.30 A.M. until 5.30 P.M. daily. The Prince of Wales's Hospital and the North Middlesex Hospital will hold a course in gastro-enterology from both medical and surgical aspects from Sept. 30th to Oct. 4th. The Metropolitan Hospital will hold its first course under the auspices of the Fellowship, in medicine, surgery, and the specialties, from Oct. 21st to Nov. 2nd. A second evening course for the M.R.C.P. examination from Oct. 15th to Dec. 6th. Further information and syllabuses may be had from the Secretary of the Fellowship at 1, Wimpole-street, London, W. 1.

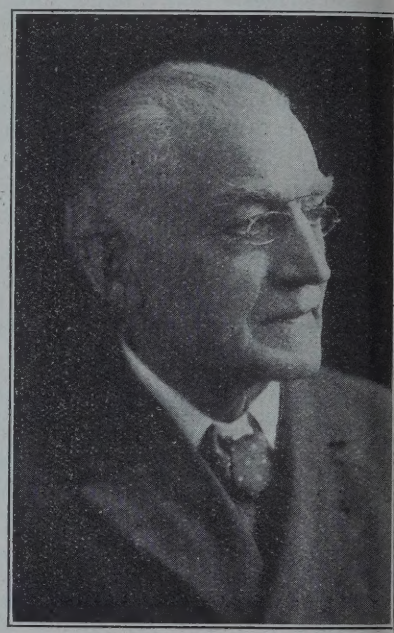
Obituary.

WILLIAM EWART, M.D. CAMB., F.R.C.P. LOND.,

CONSULTING PHYSICIAN TO ST. GEORGE'S HOSPITAL.

WE announced last week the death, on Sunday, August 11th, in his 81st year of Dr. William Ewart. This will have come as no surprise to those who knew him, since for several years he had been in a very precarious state of health; but in spite of his increasing general weakness and his painful lameness he remained until the end a familiar figure in the Athenæum, and a regular attendant at the Comitia of the Royal College of Physicians of London.

William Ewart was the son of an English father and Xenie Guillet, a French lady, and he was educated partly in England and partly at the University of Paris, where he obtained the diploma of Bac. ès Lettres. He joined the medical school of St. George's Hospital in 1869, and as a student saw service with the French army in the Franco-German war. He obtained the diplomas of the English Colleges in due course, becoming house physician to the hospital in 1873. In the following year he took the diploma of M. R. C. P. Lond., and in 1875 was elected house physician to Addenbrooke's Hospital, Cambridge, at the same time gaining at Gonville and Caius a scientific scholarship. In 1876 he graduated in the first class of the Natural Science Tripos, and proceeded to the degree of M.B., which he obtained in 1877. After some post-graduate work in Berlin he returned to St. George's Hospital as curator of the museum, lecturer on physiology, and demonstrator of physiological chemistry, was appointed pathologist to the hospital in 1879, and in 1882 was elected assistant physician. He had previously taken to the M.D. Camb., and been elected F.R.C.P.



DR. WILLIAM EWART.

[*Photograph by Elliott and Fry.*

Ewart's connexion with St. George's Hospital was a long and honourable one. He was assistant physician for seven years, during which time he was assiduous in the conduct of out-patient practice, and an informative if whimsical demonstrator of the varied clinical material which came under his eye. Many students of St. George's will remember Ewart's demonstrations, for they formed a curious difference from anything like stereotyped teaching in their rapid deductions and explanations and their alternate brevity and diffuseness. Patients, also, were often disconcerted by his methods of cross-examination—he was not really trying to convict them of inaccuracy, but his questions were often oddly worded, while he seemed impatient at the delay or confusion in the replies brought about by his own use of words. But those who attended the

out-patient department regularly under Ewart's direction learned much clinical medicine. In 1888 he was elected full physician to the Hospital, and discharged his duties with regularity and enthusiasm, although again his teaching was of an individual character that often appeared unpractical to his pupils. While assistant physician to St. George's Hospital he had also been assistant physician to the Brompton Hospital for Consumption and Diseases of the Chest, and this post, in accordance with a rule that seemed prevalent at the Hospital at that date, he was asked to resign upon election as full physician to St. George's. Ewart had been a very energetic pathologist at Brompton, and acquired a great deal of knowledge concerning phthisis, where he had been in touch with much modern work, so that it was natural that in his wards at St. George's he should be particularly interested in pulmonary cases. His physical examination of such patients was minute and laborious, and many of his clinical clerks must have been hard put to it to recognise the various signs of stationary, active, and new mischief which he would detect. He was constantly on the look-out for rare cases, and it sometimes seemed as though his high scientific equipment as a student betrayed him into associating with elaborate chemical or physical reactions circumstances which could be explained in more ordinary fashion.

Especially did Ewart's work at Brompton, although of no long duration, influence his literary interests. His most important literary work was entitled Pulmonary Cavities, and was an expansion of the Goulstonian Lectures on the subject which were delivered in 1882 before the Royal College of Physicians of London. In the course of an elaborate explanation of the methods, as he saw them, by which nature endeavours to heal pulmonary cavities, he referred in great detail to the anatomical changes which bring about the formation, collapse, contraction, and healing of these lesions, and the knowledge of the subject which he displayed—alike of the post-mortem findings and the literature—was recognised at once as remarkably intimate and well documented. He pursued the subject later in a volume upon the anatomy and nomenclature of the bronchi and pulmonary blood-vessels, while the articles on bronchitis and bronchiectasis, which he contributed to Allbutt and Rolleston's System, again revealed his deep interest in the structure of the lung. A second side of Ewart's activities was due to his experience gained at Brompton, for the influence on the tuberculous subject of climatic conditions led him to study climatology in a practical manner, and to write notes on the climatic features of various centres at home and abroad at a time when such information was badly needed.

Ewart's connexion with the Royal College of Physicians of London was a long and intimate one. Elected a Fellow in 1881, at the time of his death he was fourth or fifth on the roll of seniority. He delivered the Goulstonian Lectures in 1882, as has already been said, acted as an examiner for two separate periods of three years—1885 to 1888, and 1894 to 1898, and was a member of the Council from 1901 to 1903. To the end of his life he was a devoted servant of the Corporation, and a very regular attendant at the Comitia, where he will be sadly missed.

In practice, apart from his hospital work, William Ewart did not possess the qualities that appealed to the public, nor was he able to render the prompt and straightforward assistance to family practitioners that they and their patients expected at consultations. And thus it came about that William Ewart, with great scientific qualities and personal characteristics that endeared him to many, made no headway at all as a consultant physician.

WE have to record that Dr. JAMES DOUGLAS WRIGHT, of Wembley Park, has died suddenly at Chichester from pneumonia in his forty-fifth year. Born at Coatbridge, he was educated at the Anderson College and St. Mungo's College, Glasgow, where he qualified with the Scottish conjoint diploma in 1912. Throughout the late war he served in France, holding a captain's commission in the Royal Army Medical Corps. A period of post-graduate study at Glasgow followed, and in 1921 he became a Fellow of the Royal Faculty of Physicians and Surgeons. As a practitioner in Wembley Park he was not very widely known, but his considerable skill as a physician was appreciated, and colleagues with whom he was intimate found that they were wise in turning to him for advice when in difficulties. His kindness to his patients was reflected in their loyalty to him and his death will be much regretted. Dr. Wright was unmarried.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Capt. T. B. Shaw relinquishes his post as Professor of Hygiene and Director of Medical Studies at the Naval Medical School, Greenwich, on appointment to Chatham Hospital. Surg. Capt. J. S. Dudding succeeds Surg. Capt. Shaw.

Surg. Lt. A. A. Pomfret to be Surg. Lt.-Comdr.

The following appointments have been notified:—Surg. Capts. A. R. Schofield and C. T. Baxter to *Vivid;* and L. M. Morris to *Victory*, for R.N. Hospl., Haslar. Surg. Lts. W. R. S. Panckridge to *Nelson;* and J. L. Malone to *Alecto*

ROYAL ARMY MEDICAL CORPS.

Capts. J. M. Savege and G. K. Fulton to be Majs.

The undermentioned Lts. (on prob.) are confirmed in their rank: J. C. Gilroy, W. A. R. Ross, D. Blewitt, R. G. G. Robertson, V. C. Verbi, W. H. Scriven, J. Crealey, H. E. Knott, and M. J. Malley.

TERRITORIAL ARMY.

Capt. D. R. Jones to be Maj.

Lts. D. G. Coutts and G. A. MacDonald to be Capts.

F. W. A. Warren and N. Harkness to be Lts.

E. G. C. Darke and C. R. Croft (late Offrs. Cadet, Univ. of Lond. Contgt., Sen. Div., O.T.C.) to be Lts.

Capt. J. B. McGovern resigns his commn. and retains his rank.

TERRITORIAL ARMY RESERVE OF OFFICERS.

Lt.-Col. C. Rundle having attained the age limit relinquishes his commn. and retains his rank.

Maj. W. J. Gray having attained the age limit retires and retains his rank, with permission to wear the prescribed uniform.

Capt. (Bt. Maj.) G. Patton and Capt. F. W. Begg having attained the age limit relinquish their commns. and retain their rank.

ROYAL AIR FORCE.

Major R. H. Bebb (Army Dental Corps) is granted a temporary commission as a Squadron Leader (Dental) on attachment to the R.A.F.

Flight Lt. A. B. H. Cole (Capt. Army Dental Corps) relinquishes his temporary commission on return to Army duty.

TERRITORIAL DECORATION.

The King has conferred the Territorial Decoration upon Majs. P. E. Barber (retd.), G. H. H. Waylen, W. George, and A. H. Fullerton, and upon Capt. J. B. McGovern (retd.).

COLONIAL MEDICAL SERVICES.

Dr. P. S. Selwyn Clarke, from the West African Medical Staff, has been made Assistant Director of Sanitary Service, Gold Coast. The following appointments have been made: Dr. A. G. Badenoch, Dr. G. I. H. Braine, and Dr. R. C. Burgess, Medical Officers, Federated Malay States; Dr. B. A. S. Russell, Lady Medical Officer, Gold Coast; Dr. H. S. Begbie, Assistant Medical Officer of Health, Hong-Kong, and Dr. W. D. Forrest, Medical Officer, Hong-Kong; Dr. R. M. Dowdeswell, Dr. M. A. W. Roberts, and Dr. H. C. Trowell, Medical Officers, Kenya; Captain N. L. Joynt, Medical Officer, Virgin Islands, Leeward Islands; Dr. S. Kramer, Assistant Colonial Surgeon, St. Helena; Dr. E. K. Tratman, Professor of Dental Surgery, College of Medicine, Singapore; and Dr. D. C. Mc.E. Macpherson, Medical Officer, Gilbert and Ellice Islands, Western Pacific. Dr. C. R. Adgie and Dr. S. A. Maclean have been appointed Medical Officers on the West African Medical Staff.

Correspondence.

"Audi alteram partem."

MEDICAL WORK AT THE SCOUTS' JAMBOREE.

To the Editor of THE LANCET.

SIR,—I think that the profession in general would like to know about the important part which many of its members played in the World Jamboree at Birkenhead. From home or overseas, some 70 doctors were in camp. They represented almost every branch of the profession—consultants, practitioners, medical officers of health, the services, teaching staffs, research, specialists, and students. Many are high in the Scout movement, many are actively associated in furthering its aims; some not desiring a "busman's holiday" were to be found in important non-medical appointments at the Jamboree, and were always ready to give their professional services when required; while others, non-Scouters, stood in to lend a hand in hospital or aid-post out of sheer goodness of heart. Years did not signify; among all, there was joy in their actions and the spirit of youth on their faces. It is delightfully refreshing to see eminent medical men in the boyish and rational dress of shirts and shorts. Medical necks and medical knees take on a fine shade of tan. And the spirit of comradeship and friendliness that sprang up was perfectly splendid. A medical Scouters' dinner was held, at which almost 50 were present. The Chief Scout received the members of the health organisation (hygiene and medical staffs) on the last day of the Jamboree and expressed his great appreciation of the work they had done for Scouting.

It is fine to see so many members of our profession imbued with the spirit of scouting. For myself, it was a unique privilege to observe how magnificently they carry into practice the Scout doctrine of service to others.—I am, Sir, yours faithfully,

M. B. H. RITCHIE,
Major, Royal Army Medical Corps; Assistant Jamboree Camp Chief (Health), World Jamboree, 1929.

Military Hospital, Colchester, August 19th, 1929.

*** An annotation on medical work at the camp appears on p. 396.—ED. L.

THE TREATMENT OF HÆMORRHOIDS.

To the Editor of THE LANCET.

MY DEAR DOCTOR,—I highly esteem your magazine, THE LANCET, and am thoroughly grateful for space accorded the review of my book, "The Modern Treatment of Hæmorrhoids." It grieves me, however, to see my book misquoted in great length in the aforesaid review. May I ask you, therefore, to allow me the privilege of correcting these errors and misquotations and of making one or two remarks pertinent to the matter discussed in this review?

First, I am quoted as "still preferring a 20 per cent. solution of cresylic acid, glycerine and water." The fact of the matter is that I have never preferred nor advocated a 20 per cent. solution of this substance. What I *have* recommended and what I *do* use is a 10 per cent. solution. Since the trend of popular opinion is toward the weaker strength in injection treatment solutions, I feel that my book may be misjudged by the aforementioned statement that I prefer the 20 per cent. solution.

Secondly, I am quoted as recommending the use of a suction pump for the diagnosis of hæmorrhoids, when, in fact, my book discusses at some length the possibility of harmful effects upon the patient incident to its use and emphasised the fact that clinical judgment in the matter may be distorted by its employment. I trust you will permit me to quote my concluding sentence in this respect. I say, "We are thus liable to do the patient the injustice of ascribing to him a pathological condition, hæmorrhoids, when, in fact, what is observed as merely a normal physical response to a physical state of negative pressure." From this it must be very evident that I regard the method just as obsolete as your revewing authority does. I am, therefore, loathe to be classed among those that recommend it. Unfortunately the review does place me in that category.

Two other points that I think will bear mention are that the reviewing editor in chiding me for the lack of "facts about recurrence-rate" overlooks the fact that I have devoted one entire chapter of nine full pages to a discussion of the very subject concerning whose omission he is so deeply grieved. Finally, he deplores the lack of metric recommendation as to the dosage to be employed in the injection treatment. The instructions I do give are such as require observation during the administration of the treatment. I do believe these to be far more reliable and definite than any mathematical formula. If the good doctor will exclude all the variable factors which individuals present, will standardise the size of hæmorrhoids, their composition and consistency, and, moreover, will standardise the reaction of the tissues to the solutions we use in injection, then I will be in a position to make a specific mathematical formula which will resolve the injection treatment of hæmorrhoids into a simple process of turning a crank.

I trust you will be so good as to give as much space to this partial refutation of the review of my book as you gave to the original review. I assure you this will be greatly appreciated.

Most cordially yours,
New York, July 22nd, 1929. J. F. MONTAGUE.

*** We much regret the error as to the strength of the solution of cresylic acid. In reviewing the first edition of the work we recorded the strength of the solution correctly. With regard to the use of the suction pump, lest readers should put our reviewer's interpretation on the passages referred to, would it not be as well to much curtail in future editions reference to this technique: a lengthy and illustrative description of a measure may surely be read as a recommendation? With regard to the recurrence-rate, the statements require more detailed support in the form of definite facts, while the practitioner would certainly be much helped by information about average doses and usual limits of dosage.—ED. L.

THE ANGLO-FRENCH LIBRARY OF MEDICAL AND BIOLOGICAL SCIENCE.

To the Editor of THE LANCET.

SIR,—The kindly notice in this week's LANCET of Sir William Hamer's "Epidemiology, Old and New" (1928) emboldens me to draw attention to a project that has hitherto escaped comment. This book, and Sir Humphry Rolleston's "Aspects of Age, Life and Disease," are the first contributions, by English authors, to a series of monographs, by French, British, and American writers of distinction, that will be known as the Anglo-French Library of Medical and Biological Science. The original feature of this collection of books is that *each* volume will be published in London in English and in Paris in French. Thus, translations of the books written by Sir William and Sir Humphry are actually on the point of publication in Paris, whilst one of Prof. Achard's, "L'œdème brightique" (ready in Paris) is now in the hands of the printer in London. That a French and an English publishing house should have collaborated to this end, in the manner found possible by Messrs. Doin and Messrs. Kegan Paul and Co., is, in itself, gratifying to all those who desire to forward the exchange of ideas between members of the medical profession in the two countries. I confess to being jealous that the reception accorded to the plan in England should not be less generous than that reported to me by my co-editor, Prof. Cruchet, of Bordeaux.—I am, Sir, yours faithfully,

F. G. CROOKSHANK.
Wimpole-street, W., August 17th, 1929.

THE NEW VACCINATION ORDER.

THE new Vaccination Order, framed on the Report[1] of the committee (the Rolleston Committee) appointed in conjunction with the Medical Research Council, was issued by the Ministry of Health at the beginning of the week, together with a circular addressed to boards of guardians.

THE STATEMENT OF THE MINISTER OF HEALTH.

The Vaccination Orders will be amended especially to give effect to the following recommendations of the Rolleston Report, which will be found on p. 201 of that document :—

(1) In place of the officially advocated four insertions trial be made of vaccination and revaccination in one insertion with a minimum of trauma, and that multiple scarification and (or) cross-hatching be deprecated.

(2) Primary vaccination be performed in infancy, between the ages of 2 and 6 months as at present, and revaccination be offered at the time when a child enters school (5 to 7 years), and again on leaving (14 to 16 years).

(3) Vaccination in multiple insertions be available for such persons as desire to obtain the maximum protection against small-pox obtainable at one operation.

(4) In public vaccination parents be informed that if, in consequence of vaccination, a child requires medical attention, it is the duty of the public vaccinator concerned to provide such attention without cost to the parents.

The Minister has issued a new Order to boards of guardians dealing with these points, with a detailed explanation of certain paragraphs in the Order, contained in the first schedule which gives the official instructions to public vaccinators. Thus stress is laid upon the recommendation numbered (3) above, ensuring that where the parent or guardian of a child desires maximum protection the number of insertions may be increased up to four.

Post-vaccinal Nervous Disease.

Of post-vaccinal nervous disease, concerning which the Rolleston Report stated that though the manifestation might be extremely rare their occurrence must be of serious import, the Minister of Health says: "Post-vaccinal nervous disease, both in this country and abroad, has occurred mainly in children of school age or adolescents who had never previously been vaccinated, and that this fact emphasises the desirability of securing the successful vaccination of infants. Where this has not been attained the question which arises is whether it is advisable to vaccinate children of school age or adolescents. The Minister is of opinion that, in the present state of knowledge, and so long as the small-pox prevalent in this country retains its present mild character, it is not generally expedient to press for the vaccination of persons of these ages who have not previously been vaccinated, unless they have been in personal contact with a case of small-pox or directly exposed to small-pox infection."

THE VACCINATION ORDER, 1929.

After the preamble, according to form setting out references to existing vaccination orders, the new Order sets out an amendment of paragraph 6, Form A, in the schedule to the Order of 1924 which ensures after-inspection by the public vaccinator both of any vaccination performed by himself or a medical practitioner to give the necessary certificate of successful operation. Where he is himself the operator he is to render any subsequent treatment required. A further paragraph sets out that revaccination, which is stated to be desirable at the ages of 5 and 14, will be performed free of cost on application to the public vaccinator.

[1] Cmd. 3148, H.M. Stationery Office. 7*s*.

Instructions to Vaccinators under Contract: the First Schedule.

(1) Except so far as any immediate danger of small-pox may require, the public vaccinator must vaccinate only subjects who are in good health. As regards infants, he must ascertain that there is not any febrile state, nor any irritation of the bowels, nor any unhealthy state of the skin, especially no chafing or eczema behind the ears, or in the groin, or elsewhere in folds of skin. He must not, except of necessity, vaccinate in cases where there has been recent exposure to the infection of diseases such as measles, scarlatina, or diphtheria, nor where erysipelas is prevailing in or about the place of residence.

(2) If it be necessary to postpone vaccination on medical grounds a certificate to that effect must be given by the public vaccinator in the form prescribed by the Minister of Health or to the like effect—

(*a*) If in his opinion the child is not in a fit and proper state to be vaccinated; or

(*b*) If in his opinion the child cannot be safely vaccinated on account of the condition of the house in which it resides or because there is or has been a recent prevalence of infectious disease in the district; and in any such case the public vaccinator is required forthwith to give notice of such certificate to the medical officer of health of the district in the Form P. set out in the Fifth Schedule to this Order,[2] or to the like effect.

(3) All public vaccinations are to be performed with glycerinated calf lymph or with such other lymph as may be issued by the Minister of Health. If the parent or other person having the custody of the child requires that it shall be vaccinated with lymph issued by the Minister of Health, the vaccination must be performed with such lymph.

(4) The public vaccinator must keep such record of the lymph he uses for vaccination as will enable him always to identify the origin of the lymph used in each operation. He must not employ lymph supplied by any person who does not keep an exact record of its source.

(5) The public vaccinator must keep in good condition the lancets or other instruments which he uses for vaccinating, and he must not use them for any other purpose whatever. When vaccinating he must have with him the means of sterilising and cleansing his instruments. He must cleanse and sterilise his instruments immediately before and after performing each vaccination. When once he has unsealed a tube of lymph he must never attempt to keep any part of its contents for the purpose of vaccination on a future occasion. In no circumstances whatever should the mouth be applied directly to the tube in which the lymph is contained for the purpose of expelling the lymph. In the case of ordinary capillary tubes an artificial blower may be properly used for this purpose.

(6) Vaccination should at every stage be carried out with aseptic precautions. These should include: First, the thorough cleansing of the surface of the skin before vaccination; secondly, the invariable use of sterilised instruments; and thirdly, the effective protection of the vaccinated surface against extraneous infection both on the performance of the operation and on inspection of the results.

Advice should always be given to the person having the custody of the child as to the necessity of effective protection of the vaccinated surface until the scabs have fallen and the arm has healed.

(7) In all ordinary cases of vaccination or revaccination, the public vaccinator should vaccinate in one insertion preferably by a single linear incision or scratch not more than a quarter of an inch long merely through the epidermis. This incision should be made in the long axis of the limb. The lymph may be applied to the cleansed skin and the incision made through it, or the lymph may be applied to the incision immediately after the latter has been made. The lymph may be gently rubbed into the scratch with the side of the needle or lancet. In cases in which the public vaccinator or the vaccinee (or the parent or other person having custody of a child vaccinee) desires to obtain additional protection at one operation (i.e., where the maximum protection against small-pox is desired, or where the circumstances make it especially desirable to avoid risk of failure), the public vaccinator may, if he considers it necessary, increase the number of such insertions. The number of insertions should not exceed four, and they should be placed so as to avoid coalescence of the resulting vesicles. The aim of the public vaccinator should be to produce successful vaccination with the minimum of injury to the tissues. In no circumstances should the vaccinated area be cross-scarified or cross-hatched.

[2] i.e., The Vaccination Order, 1898.

Opportunity should be taken by the public vaccinator to recommend that, in view of single-insertion vaccination, revaccination is advisable at an earlier period than if more insertions had been made than one.

(8) The public vaccinator must enter all cases in his register on the day when he vaccinates them, together with all particulars required in the register up to and including the column headed "Initials of person performing the vaccination." The results of the vaccination are to be entered in the register upon the day of inspection and attested by the initials (in column No. 13) of the person who makes the inspection. In cases of successful *primary* vaccination the public vaccinator must record the number of separate normal vaccine vesicles or groups of vesicles which have been produced. In cases of *revaccination* he must register as "successful" only those cases in which either vesicles, normal or modified, or papules surrounded by areolæ, have resulted.

When any operation (whether vaccination or re-vaccination) has to be repeated owing to want of success in the first instance it should be entered as a fresh case in the register.

The new Order comes into force on Oct 1st, 1929.

Medical News.

ROYAL COLLEGE OF PHYSICIANS OF LONDON.—The Council of the College are prepared to receive applications for the office of Milroy Lecturer for 1931 on State Medicine and Public Health. Particulars will be found in our advertisement columns.

ROYAL COLLEGE OF SURGEONS OF ENGLAND: *Examination in Canada.*—A Primary Examination in Anatomy and Physiology for the Fellowship of the College was held at Toronto on August 6th and the following days, this being the first occasion on which this examination has been held out of England. The examination was conducted by Profs. William Wright, W. E. Le Gros Clark, C. Lovatt Evans, and John Mellanby, who were sent out from England for the express purpose, with Profs. J. P. McMurrich and C. H. Best, of Toronto University, as assessors. Sir Holburt Waring also attended as visitor on behalf of the College. Twenty-three candidates presented themselves for examination and nine were successful. The Canadian Medical Association was responsible for the arrangement, and much of the success of this new departure was due to Dr. Alexander Primrose, Dean of the Medical Faculty of the University of Toronto, and Dr. T. C. Routley, General Secretary of the Association, who took an active part in bringing about this attempt to offer to Canadian medical practitioners greater facilities for obtaining the F.R.C.S. Eng. There is a strong desire in Canada for closer association between the medical profession in the Dominion and in this country, and much interest has been taken in Canada and the United States in the undertaking. The examiners were received by the Governor-General at Quebec, and by the Prime Minister at Ottawa, who expressed sympathetic interest in their mission. The Final Examinations for the Fellowship will be conducted only in England, but the opportunity of passing the Primary Examination in Canada should make two visits to this country unnecessary, and so, it is hoped, bring the F.R.C.S. Eng. within the reach of a larger number of Canadians than has hitherto been the case.

INSTITUTE OF HYGIENE.—On August 16th a luncheon was held on the premises at 28, Portland-place, London, W., to celebrate the granting of a Royal Charter of incorporation to this Institute which was founded in 1903. In the absence of Sir Thomas Oliver, the President, the chair was taken by Prof. J. W. H. Eyre, a Vice-President, who spoke of the work done over a long period in persuading manufacturers to provide unsophisticated food and drink and good clothing, and in trying to improve conditions of life generally. Prof. Bostock Hill, in proposing the toast of the Institute, referred to the work of the National Health Week Committee over which he had presided for 18 years. Dr. Harry Campbell responded to the toast; Dr. Andrew Balfour proposed the health of the Chairman; Mr. A. L. Peterson spoke of the value of the Institute from the point of view of the manufacturer; and Mr. Seymour Harding, the Secretary, responded to the toast of his health.

DEGREES AND DIPLOMAS IN PUBLIC HEALTH.—The Royal Institute of Public Health has issued a booklet describing the course of instruction which it offers to candidates for these degrees and diplomas. It may be had from the Secretary of the Institute, 37, Russell-square, London, W.C. 1.

UNIVERSITY OF MELBOURNE.—Dr. R. Marshall Allan, M.C., has been appointed professor of obstetrics in the University. At one time Assistant Master of the Rotunda Hospital, Dublin, he has been director of obstetric research at Melbourne University for the past two years. He is a graduate of Edinburgh University and a Fellow of the Edinburgh Royal College of Surgeons.

ST. THOMAS'S HOSPITAL MEDICAL SCHOOL.—The following awards have been made for 1929–1930: A University Scholarship to John Bishop Harman, of St. John's College, Cambridge; Entrance Science Scholarships to C. J. Cobbe and to S. H. Alavi and R. H. R. Belsey; and a William Tite Scholarship to H. R. B. Norman.

GIFT FOR VETERINARY RESEARCH.—The Government of New South Wales has accepted a gift of £20,000 from Mr. F. D. McMaster for the erection of an animal health laboratory by the Scientific and Industrial Research Department.

THANK-OFFERING FUND.—The Fund being raised to commemorate the recovery of the King now stands at about £490,000. Of this sum £187,000 is contributed to the National Radium Fund, whilst the remainder, which is received by King Edward's Hospital Fund for London, includes amounts which have been ear-marked for individual hospitals.

Appointments.

DAVIES, L. M., M.D., B.Ch. Oxf., D.P.H., has been appointed Medical Officer of Health, Devon.

MACDONALD, E. K., M.D., B.S. Lond., Medical Officer of Health, Barnsley.

WEAVER, A. E. REMMETT, M.D., Ch.B. Birm., D.P.H., Medical Officer of Health for the Weston-super-Mare Urban district.

Certifying Surgeons under the Factory and Workshop Acts: PICKELS, J. A., M.B., B.S. Lond. (Uffculm District, Devon), and SARAFIAN, D. H., L.R.C.P. Lond., M.R.C.S. (Chipping Sodbury, Gloucester).

Vacancies.

For further information refer to the advertisement columns.

***Birkenhead General Hospital.*—Cas. S. £100.**

Birmingham City Education Committee.—Asst. School M.O. £600.

Bradford, Municipal General Hospital, St. Luke's.—H.P.'s and H.S.'s. Each at rate of £200.

Bristol Royal Infirmary.—H.P. to Cancer Research Dept. At rate of £60.

Chester Royal Infirmary.—H.S., &c. £120.

Coventry and Warwickshire Hospital.—Hon. Anæsthetist.

Evelina Hospital for Children, Southwark, S.E.—H.S. £120.

***Exeter, Royal Devon and Exeter Hospital.*—Asst. H.S. At rate of £100.**

Freemasons Hospital and Nursing Home, 237, Fulham-road, Chelsea, S.W.—Res. M.O. At rate of £250.

Great Yarmouth General Hospital.—Sen. H.S. £150. Also Secretary £300.

Hospital for Tropical Diseases, Endsleigh-gardens, W.C.—Two H.P's. Each at rate of £150.

Hospital for Women, Soho-square, W.—Res. M.O. At rate of £100.

Hull Royal Infirmary.—Cas. H.S. Also Asst. H.P. Each at rate of £130.

Kidderminster and District General Hospital.—H.S. £150.

Kingston-upon-Hull, City and County of.—M.O.H. £1500.

King's Lynn, West Norfolk and Lynn Hospital.—Sen. and Jun. H.S.'s. £150 and £100 respectively.

Lanarkshire Joint Committee on Venereal Diseases.—Venereal Diseases O. £750.

Leicester Royal Infirmary.—H.S.'s, H.P. Also Cas. O. Each at rate of £125.

Liphook, Hants, King George's Sanatorium for Sailors.—Asst. M.O. At rate of £200.

Liverpool University.—Lecturer in Pathology. £600.

Liverpool and District Hospital for Diseases of Heart.—H.P. At rate of 50 guineas.

London Jewish Hospital, Stepney Green, E.—Cas. O. At rate of £150.

London Temperance Hospital, Hampstead-road, N.W.—Cas. O. At rate of £120.
Lowestoft and North Suffolk Hospital.—H.S. £150.
Maidstone, Kent County Ophthalmic and Aural Hospital.—Aural H.S. At rate of £200.
Manchester, Ancoats Hospital.—H.S. At rate of £100.
Manchester Royal Children's Hospital, Gartside-street.—Two Asst. M.O.'s. Each at rate of £150.
Manchester Royal Children's Hospital, Pendlebury.—Res. M.O. At rate of £125.
Mount Vernon Hospital, Northwood, Middlesex.—H.S. At rate of £200.
Nottingham General Hospital.—H.P. Also Asst. Res. Cas. O. Each at rate of £150.
Oswestry, Shropshire Orthopædic Hospital and Agnes Hunt Surgical Home.—H.S. £200.
Prince of Wales's General Hospital, Tottenham, N.—Hon. Anæsthetist.
Rotherham Hospital.—H.P. £180.
Royal College of Physicians.—Milroy Lecturer for 1931.
Royal National Orthopædic Hospital, 243, Great Portland-street, W.—H.S. also H.S. for Country Branch, Stanmore. Each at rate of £150.
Royal Northern Hospital, Islington Tuberculosis Dispensary, Holloway, N.—Tuberculosis Officer. £750.
St. Marylebone Hospital, Ladbroke-grove, W.—3rd Asst. M.O. £300.
St. Peter's Hospital for Stone, &c., Henrietta-street, Covent-garden, W.C.—H.S. At rate of £75.
St. Vincent's Orthopædic Hospital, Eastcote, Middlesex.—Res. M.O. At rate of £150.
Scarborough Hospital and Dispensary.—Two H.S.'s Each at rate of £126.
Sheffield City.—Asst. Tuberculosis Officer. £600.
Sheffield Royal Infirmary.—Jun. Aural and Ophth. H.S. At rate of £80. Also Clin. Asst. for Ophth. Dept.
Southampton, Royal South Hants and Southampton Hospital.—Jun. H.S. Also Cas. O. At rate of £130 and £120 respectively.
Tipton Urban District Council.—M.O.H., &c. £800.
Torquay, Torbay Hospital.—Hon. P. Also H.P. £175.
Wakefield, West Riding Mental Hospital.—Jun. Asst. M.O. £400.
Watford, Herts Peace Memorial Hospital.—Res. M.O. At rate of £150.
Weir Hospital, Grove-road, Balham, S.W.—Sen. and Jun. Res. M.O.'s. £200 and £150 respectively.
Weston-Super-Mare General Hospital.—H.S. £130.
Worcester General Infirmary.—Sen. and Jun. Res. M.O.'s. £180 and £120 respectively.

The Chief Inspector of Factories announces a vacancy for a Certifying Factory Surgeon at Freshford (Somerset).

The Secretary of State for the Home Department gives notice of a vacancy for a Medical Referee under the Workmen's Compensation Act, for the Districts of the Eastbourne and Hastings County Courts (Circuit No. 50). Applications for the post should reach the Private Secretary, Home Office, not later than Sept. 4th.

Births, Marriages, and Deaths.

BIRTHS.

JAIDKA.—On August 8th, at "Newcroft," Eastfield, Peterborough, the wife of K. C. Jaidka, F.R.C.S.E., of a daughter.
SCOTT.—On August 7th, at Fletcher House, Tottenham, N., the wife of Dr. J. A. A. P. Scott, of a daughter.

MARRIAGES.

BELLAMY—MCGREGOR.—On July 30th, at St. Bartholomew's the Great, E.C.1, William Albert Bellamy, M.R.C.S., L.R.C.P., to Elsie, youngest daughter of the late C. M. McGregor and Mrs. McGregor, of Plumstead.
DAUKES—BIGGS.—On August 16th, at the Presbyterian Church of England, Hove, Lieut. H. W. Daukes, R.A.M.C., to Olive Margaret, eldest daughter of Mr. and Mrs. Owen O. Biggs, of Sackville-gardens, Hove.
RUSSELL—BREW.—On August 12th, at St. Augustine's Church, Penarth, Arthur Victor Russell, M.B., to Mary Violet, eldest daughter of Dr. and Mrs. Richard W. Brew, of Penarth, South Wales.

DEATHS.

BEACH.—On August 18th, at De Crespigny-park, Denmark Hill, Fletcher Beach, M.B. Lond., F.R.C.P., M.R.C.S., L.S.A., aged 84.
BUCKLEY.—On August 8th, at Clopton Manor, Kettering, Northants, Thomas William Buckley, M.D. Durh., M.R.C.S. Eng., J.P., Major, late R.A.M.C., aged 70 years.
SPENCE.—On August 12th, in a London nursing home, John Buchan Spence, M.B., aged 73.
WHITE.—On August 7th, suddenly, at Juan les Pins, Herbert White, M.R.C.S., L.R.C.P., late Surgeon Lieut. Com., R.N., in his 46th year.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

ARTIFICIAL CREAM: A PROSECUTION.

THE Artificial Cream Act, passed last May and taking effect at the beginning of June, was a measure pressed forward rather in the interests of agriculture than of public health. It is, nevertheless, worth while to note that the first prosecution under the Act occurred at Marlborough-street police station on August 13th when the Ferns Pure Milk and Cream Company was fined sums amounting to £10 2*s.* with £7 costs for a breach of the statute.

The Act defines "cream" as "that portion of natural milk rich in milk fat which has been separated by skimming or otherwise," and "artificial cream" as "an article of food resembling cream and containing no ingredient which is not derived from milk except water or any ingredient or material which by virtue of the proviso to Subsection (2) of the Food and Drugs (Adulteration) Act, 1928, may lawfully be contained in an article sold as cream." The statute makes it an offence to sell or offer for sale for human consumption under a description or designation including the word "cream" any substance purporting to be cream or artificial cream within the statutory definition unless (*a*) the substance is cream as defined in the Act, or (*b*) where the substance is artificial cream as defined in the Act, the word "cream" is immediately preceded by the word "artificial." The defendant company said its artificial cream was made out of the constituents of dairy cream and nothing else. A Government analysis stated that it was reconstituted cream with a low fat content. It was two-thirds the price of ordinary cream. There had been some misunderstanding about the label. The magistrate, who remarked that the very name of the company was misleading, said that the Act was no good unless it was enforced. The label, even when affixed to the carton, was misleading; there was nothing about artificial cream until the receptacle was turned round, and then the words were upside down. The artificiality of the substance ought not to be concealed but should be more prominent than anything else.

The prosecution was undertaken by the National Farmers' Union, but it may be noted that the Act casts upon the local food and drugs authorities the duty of enforcing its provisions. All premises where artificial cream is manufactured, sold or exposed for sale for human consumption must be registered with the local authority unless already registered under other provisions. The public will doubtless appreciate the opportunity of distinguishing a natural from a synthetic article of food.

ATOPHAN ADMINISTERED BY INUNCTION.

IN many European schools it is becoming fashionable to give drugs by the skin. Alimentary disturbances, both immediate and remote, may thereby be avoided, and apart from comfort and consequences it is naturally an advantage to avoid the change that the remedy will disintegrate in the stomach. Many drugs damage the liver when given by mouth, and it is claimed that this trouble is largely obviated by using the cutaneous route. The difficulty of absorption is, of course, often great. Volatile bodies, for instance, are not nearly so readily absorbed by the skin as by the lungs or alimentary tract. Alkaloids, again, are very uncertain in their penetration, whatever the vehicle, and aqueous solutions of non-volatile drugs hardly pass through the skin at all. But a good many drugs mixed with oil, fat, or alcohol—in short, anything capable of mixture with, or permeation through, the extracutaneous film of grease and the cutaneous fat—seem to be absorbed consistently and rapidly. This has led Prof. H. Kionka,[1] of Jena, to try inunction as a means of administering atophan, a trade preparation of phenyl-cinchoninic acid, which has come in for a certain amount of criticism on account of its toxic action on the liver in certain cases. Like other quinoline carbonic derivatives, atophan is said to have the curious power of reducing the ability of the renal tubules to reabsorb urates. When they are taken by mouth a considerable increase in the urinary excretion of all the urates is seen. The body tissues and the articular structures in particular are depleted of uric acid and the clinical amelioration of gout may be brought about. Kionka gave the drug to rabbits in two different forms, the first being an ointment composed of vaseline and olive oil as the vehicle; and the second a commercial preparation called Doloresum-tophiment, in which the atophan exists as an amino compound and the vehicle is a soap fat. The

[1] Fort. d. Ther., 1929, v. 173.

efficacy of the commercial preparation was found to be double that of the crude ointment as measured by the quantitative urinary excretion of uric acid. This heightened activity is attributed to the soap fat basis.

It will be remembered that the question of the toxicity of phenyl-cinchoninic acid was fully discussed in our own columns not long ago by Dr. Geoffrey Evans and Dr. A. W. Spence.[2]

BIRTH CONTROL.

AT the Population Conference at Geneva in September, 1927, a body was formed called the International Medical Group for the Investigation of Birth Control. The second annual issue[3] of their report, which is now obtainable, contains contributions from six different countries, those from Great Britain and the United States being the longest. The papers are for the most part written according to a common plan, the headings of which are: Statistical investigations, research work of a relevant kind, information about the general temper of the country towards birth control, and "miscellaneous remarks."

The section most likely to prove interesting to English medical readers is the one which concerns Great Britain, written by Dr. C. P. Blacker. In this article an attempt is made to summarise what is known statistically of the value of different contraceptive methods. These are found to be less effective than is generally assumed. The data analysed are those of certain birth control clinics. Among patients with whom the clinics maintain touch, the various methods taught are found in one way or another to be unsatisfactory by a percentage that ranges from 9 per cent. (Walworth) to 24 per cent. (North Kensington). Among patients with whom the clinic fails to maintain contact, a small number of whom were visited in their homes by a social worker of the North Kensington Clinic, the percentage is higher. In the United States the method which is thought the most reliable, and which is most usually taught, is a combination of pessary and spermaticidal jelly. The follow-up system that prevails in the American clinic, whose figures are analysed, is very thorough. It is interesting, therefore, to note that for this combination of methods, as taught in America, the "failure rate" is only 5 per cent. It is acknowledged that the figures on which the British percentages are based are inadequate. A satisfactory system of keeping case records has only been evolved after much experience and thought, and the early records from which the percentages have been extracted are both incomplete and unsatisfactory. Even so, however, the figures give cause for disquietude. Nevertheless the report as a whole is encouraging in that it foreshadows the possibility of great improvement in contraceptive technique as a result of certain research now in progress.

The report attempts to appraise impartially the value of contraceptive methods in use in different countries, and to summarise medical information about birth control as it becomes known in different countries. In view of the great sociological importance of contraception it is possible that future reports may have considerable influence both at home and abroad.

ULTRA-VIOLET RAYS IN OPHTHALMOLOGY.

THE positive and negative indications for the use of ultra-violet rays in diseases of the eye are defined in a recent paper by Mr. W. S. Duke-Elder.[4] Tuberculous iridocyclitis, he says, is especially suitable for general light treatment combined with tuberculin, and another disease in which its value is very great is phlyctenular keratoconjunctivitis. In chronic cases, especially when general light baths are used in association with local application of light, the disease can almost invariably be overcome, although corneal opacities once formed may be permanent. The more important part of Mr. Duke-Elder's paper concerns the local application of ultra-violet rays, for which he has devised a special ophthalmic radiation lamp. Many inflammatory and degenerative affections of the anterior segment of the eye are amenable to this treatment, but it is essential that it should be undertaken only by specially skilled hands, since an error in the focusing might easily cause permanent injury to the lens. For this reason it is only suitable for diseases of the cornea, iris, sclera, and conjunctiva. Pathogenic micro-organisms are killed, also the superficial cells of damaged corneal epithelium, and an intense vascular reaction floods the diseased cornea with bactericidal influences. Almost any kind of corneal ulcer, including hypopyon ulcer, responds well to the treatment. In mild affections the usual therapeutic methods may be sufficient without exposure to ultra-violet rays, but in severe and recurrent cases it is invaluable. The method is also indicated in sclero-keratitis and in some conjunctival affections, which fail to improve under ordinary measures; among these Mr. Duke-Elder includes trachoma but not spring catarrh. For applying the rays to the upper conjunctival fornix he has devised a special form of application to be used with his lamp.

[2] THE LANCET, 1929, i., 704.

[3] Obtainable from the Hon. Mrs. Marjorie Farrer, 41B, Clanricarde-gardens, London, W. Price 6d.

[4] Brit. Jour. Actinother. and Physiother., July, 1929, p. 82.

HOLIDAYS FOR FACTORY GIRLS.

To the Editor of THE LANCET.

SIR,—You have on many other occasions shown your sympathy with factory girls in need of a holiday, and have earned their sincere gratitude by allowing us to appeal through your columns to the generosity of your readers. May we again, in circumstances of urgency, invoke your friendly aid? In heat such as we have experienced lately in our crowded towns, one longs more than ever for a dip in the sea or for a breath of air on the hills; for meals out of doors, lunch in a bathing suit on the sands, a picnic tea under the shade of the trees. Whatever indeed the weather may be, one looks forward throughout the year to the summer holiday, for many the only appreciable holiday, in the hope that it will bring respite and rest and renewal of health.

Some of your readers will know of hopes for a holiday frustrated, of plans long made brought to nought at the last moment. Those who have not been so unfortunate can at least imagine the bitter disappointment caused by the loss of a holiady long due. Such a disappointment will assuredly fall to many tired workers in factories this summer unless your readers, to whose generosity we appeal, are able to come to the rescue. Many factory girls who have done their best to make some provision for a holiday by putting aside their pence throughout the year, are waiting to go away; but the funds which seek to supplement their savings are exhausted. We ask your readers to replenish them.

The help thus given is accepted with lasting gratitude. It blesses those who give and those who take. Many letters, written by the girls in a spirit of deep thankfulness and describing the varied delights of a change of air and scene, testify eloquently to this. Quotations from such letters may be seen in the report of the fund. The fund helps chiefly the poorest class of factory workers. It helps those who, being often the main support of their families, are quite unable in this matter adequately to help themselves. They need this summer holiday, and one has only to see them before and after it to realise what wonders such a holiday can work.

Subscriptions and donations will be thankfully received and acknowledged by the hon. treasurer, Mrs. Slater, or Miss Canney, 75, Lamb's Conduit-street, London, W.C. 1.

We are, Sir, yours faithfully,

(Signed) ALBERTA SANDWICH,
KATHERINE ATHOLL,
A. F. LONDON,
W. PETT RIDGE,
ANNE SLATER (Hon. Treas.).
J. FREDK. GREEN (Chairman).

75, Lamb's Conduit-street, London, W.C. 1,
August 16th, 1929.

A DISCLAIMER.

To the Editor of THE LANCET.

SIR,—Reference an article in your issue of August 10th headed "An Ingenious Truss," describing an apparatus manufactured by the Uterpress Co., and named by them the "Colquhoun" truss, I should be glad if you will publish this, which is to the effect that I have no interest in the name, manufacture, or sale of the truss mentioned.

I am, Sir, yours faithfully,

GIDEON COLQUHOUN, F.R.C.S.

44, Brook-street, W., August 20th, 1929.

NATIONAL HOSPITAL FOR THE PARALYSED AND EPILEPTIC, QUEEN-SQUARE.—Last year 1464 in-patients were treated at the hospital itself, at the Convalescent Home at East Finchley, and at Lonsdale House, Clapham, the branch for disabled sailors and soldiers. The cost of maintenance was £39,177, which exceeded the income by £4795. The board are anxious for the preservation of Queen-square House Garden, since the amenities of the hospital would be seriously affected if it were built over.

STUDENTS' GUIDE—SESSION 1929-1930.

ENERAL COUNCIL OF MEDICAL EDUCATION AND REGISTRATION OF THE UNITED KINGDOM.

POWERS, DUTIES, AND CONSTITUTION.

THE General Council of Medical Education and Registration of the United Kingdom is, first, a egistering body: no person, even though his qualifications have been obtained by examination, is a *legally ualified* medical practitioner until his name appears n the Medical Register. Secondly, it is a standardsing body, ensuring that medical education reaches an fficient minimum standard by scientific examination. Thirdly, it is a penal and disciplinary body, having ower to remove from the Register any practitioner onvicted of felony or misdemeanour or adjudged guilty f professional misconduct. Fourthly, to the Council s committed the codification of pharmaceutical emedies. The duties of the Council are thus primarily f a public nature, and its construction shows its itness for its fourfold responsibilities.

The Council consists of 38 members, of whom all ut 11 are official representatives of some corporate ody. Five members are chosen by the Crown on the dvice of the Privy Council, and six others are elected y the members of the medical profession as Direct Representatives. The Crown members need not be nedical men and one layman now sits on the Council. Three members are appointed for dental business by he Privy Council under the Dentists Act, 1921, nder which the powers and duties of the General Medical Council with regard to the keeping of the Dentists Register and the administration of the Dentists Acts were largely transferred to the Dental Board of the United Kingdom.

THE EDUCATIONAL CURRICULUM.

Professional Education.—The course of professional tudy after registration as a student occupies at least ve years. The Final Examination in Medicine, urgery, and Midwifery must not be passed before the lose of the fifth academic year of medical study.

Regulations as to Registration of Medical Students.

Before registration as a student every candidate hould produce evidence that (*a*) he has attained the ge of 17 years; (*b*) that he has passed a recognised xamination in general education; and (*c*) that, *n addition thereto*, he has passed, or obtained xemption from, an examination, theoretical and ractical, in elementary physics and elementary hemistry conducted or recognised by a licensing ody. The minimum standard of General Education equired is that of University Matriculation or ntrance examination in the Faculties of Arts or ure Science. In other Faculties the examination ust be of the standard prescribed in Regulation 2 elow.

An approved course of instruction in elementary iology at a secondary school or other teaching stitution recognised by a licensing body may limit a student to the professional examination in lementary biology upon registration as a medical udent.

The candidate commencing medical study should pply to the registrar of the division of Great Britain nd Ireland in which he is residing, according to a rescribed form, copies of which may be had on pplication to the several licensing bodies, medical hools, and hospitals, or at the offices of the Council; nd should produce proof that he, or she, has fulfilled e first three conditions.

The Maintenance of the Register of Medical Students.

1. The Education Committee prepares and issues from time to time a list of examining bodies whose examinations in general education fulfil the conditions of, and are specially recognised by, the Council.

2. The Council has recognised the undernoted university examinations which are conducted in Great Britain and admit to the Faculties of Arts or Pure Science, or to other Faculties, subject to the conditions specified below:—

Oxford University, Responsions; Cambridge University, The Previous Examination. The Matriculation Examinations of the following Universities: Birmingham, Bristol, Durham, Leeds, Liverpool, London, Victoria of Manchester, Sheffield and Wales, and the Entrance or Preliminary Examination of the Universities of Scotland.

The condition prescribed by the Council in Faculties other than Arts or Pure Science is that:—

The certificate shall bear evidence that the candidate has passed in the Matriculation or Entrance standard, in the following subjects, viz.: (*a*) English. (*b*) Mathematics, Elementary. (*c*) A language other than English. (*d*) A fourth subject, as defined in the regulations of the particular Examination, to be chosen from the subjoined list, viz.: History, Geography, Physical Science, Natural Science; Latin, Greek, Hebrew, French, German, or other language accepted by the University for the purpose of matriculation or entrance.

3. Subject to the condition prescribed above (Section 2), the Council will recognise those of the examinations conducted by recognised authorities in Great Britain which are accepted by any one or more of the above-named Universities as equivalent (under prescribed conditions as to "credits" or "grades"), for purposes of Entrance or Matriculation, to an Examination named in the preceding list (Section 2). Such Examinations are:—

Bristol University: Higher School Certificate Examination; School Certificate Examination. Cambridge Local Examinations Syndicate: Higher School Certificate Examination; School Certificate Examination. Central Welsh Examination Board: Higher Certificate Examination; School Certificate Examination. Durham University: Higher Certificate Examination; School Certificate Examination. London University: Higher School Certificate Examination; General School Examination. Northern Universities Joint Matriculation Board: Higher Certificate Examination; School Certificate Examination. Oxford and Cambridge Schools Examination Board: Higher Certificate Examination; School Certificate Examination. Oxford Delegacy for Local Examinations: Higher School Certificate Examination; School Certificate Examination. Scottish Education Department: Leaving Certificate Examination.

4. The Council will continue to recognise certain Examinations conducted by Educational Bodies, other than those (mentioned in Section 3) whose Examinations are accepted by any one or more of the Universities of Great Britain. Recognition will not be extended under this Section to any Examination unless the Council is satisfied (*a*) that in scope and standard it is equivalent to a recognised Matriculation or Entrance Examination of a University of Great Britain, (*b*) that it fulfils the condition prescribed by the Council (Section 2), and (*c*) that the Examination has been completed at not more than two sittings. Such Examinations are:—

The College of Preceptors (England): Senior Certificate. The Educational Institute of Scotland: Preliminary Medical Certificate.

5. Subject to the prescribed condition (Section 2), the Council will recognise the Entrance Examination to the School of Physic of the University of Dublin, and the Matriculation or Entrance Examinations of the National University of Ireland, the Queen's University of Belfast, the Irish Royal Colleges of Physicians and Surgeons; and also the Leaving Certificate of the Department of Education of the Irish Free State, the Senior Grade Leaving

Certificate of the Ministry of Education of Northern Ireland, and all examinations accepted by any one or more of the Universities of Great Britain or Ireland, as equivalent, for purposes of entrance or matriculation, to the above-named University Examinations.

6. Subject to the prescribed condition (Section 2), the Council will recognise all Examinations of Colonial or Foreign Universities which are accepted by any one or more of the Universities of Great Britain as equivalent, for purposes of entrance or matriculation, to an examination named in the list of examinations recognised by the Council (Section 2).

7. The Council will recognise the Final Examinations for Degrees in Arts or Science of any University of Great Britain or Ireland or of the British Dominions.

8. The registration of medical students shall be placed under the charge of the Branch Registrars.

9. Each of the Branch Registrars shall keep a register of medical students.

10. The Branch Registrar shall enter the student's name and particulars in the Students Register, and give him a certificate of such registration.

11. Each of the Branch Registrars shall supply to the several licensing bodies, medical schools, and hospitals, in that part of Great Britain or Ireland of which he is Registrar, blank forms of application for the registration of medical students.

12. A copy of the Medical Students Register prepared by each of the Branch Registrars shall be transmitted, on or before Dec. 31st in each year, to the Registrar of the General Council, who will distribute the list to the licensing bodies, medical schools, and hospitals.

All applications for special exceptions to the foregoing regulations as to registration shall be addressed to the Registrar of the General Council, and shall be decided by authority of the Education Committee, who shall report thereon to the Council.

The Medical Schools and Colleges.

The Universities, including their Colleges and Medical Schools, and Schools of Medicine at which Medical Study may be commenced in the United Kingdom are set out seriatim in the following pages.

Medical Registration in Ireland.

The problem of medical registration in the Irish Free State, which gave rise to some anxiety a short while back, has been satisfactorily settled. By agreement between the Governments of Great Britain, of the Irish Free State, and of Northern Ireland — since confirmed by legislature at Westminster and Dublin—the powers and duties of the General Council of Medical Registration and Education are to continue as heretofore in respect of qualifying bodies in the Irish Free State, and of medical practitioners qualified in the Irish Free State. Side by side with this a Medical Council has been set up in the Irish Free State with the duty of establishing and controlling a Register for the Irish Free State. Practitioners whose names are on the General Register, and persons who pass a qualifying examination in the Irish Free State, will be registered on the Irish Free State Register on payment of the prescribed fee. The Irish Free State Medical Council have, over those whose names are on the Irish Free State Register, the same disciplinary powers as are possessed by the General Council over those whose names are on the General Register. To possess the privileges of a qualified practitioner in the Irish Free State it is necessary to be registered in the Irish Free State Register.

The net result of the change in the law as regards the practitioner qualifying in the Irish Free State in the future is that: (1) If he intends to practise only in the Irish Free State he need only register in the Irish Free State Register; (2) if he intends to practise in Great Britain he will register in the General Register; and (3) if he is in doubt where he will practise he will register in both Registers. He will, as he registers in one Register, or in both Registers, put himself under the disciplinary control of the one Council or of both Councils. No practical inconvenience is caused, and practitioners qualified in the Irish Free State in future will not find themselves deprived of any of the privileges or rights enjoyed by their predecessors.

The Dental Board of the United Kingdom.

Anyone who is on the Medical Register is entitled to practise as a dentist, although he cannot register as such without degree or licence in dentistry; but it is a distinct advantage to take a special dental qualification, otherwise few dental appointments at general or special hospitals or dispensaries are available, and, unless registered in the Dentists Register, no dental work, under the additional Benefit Scheme of the National Health Insurance Act can be undertaken.

Under the Dentists Act, 1921, the powers and duties of the General Medical Council under the Dentists Act, 1878, and under the Medical Act, 1886, which related to the keeping of the Dentists Register and the administration of the Dentists Acts were largely transferred to the then newly constituted Dental Board of the United Kingdom. The registration of dental students at the commencement of their dental studies, and the right of erasure of a name from the Dentists Register, remain with the Council, but the duty of inquiring into disciplinary cases rests with the Board, upon whose recommendations the Council acts.

The Dental Board consists of a chairman and 12 members. The chairman is appointed by the Privy Council. Other members of the Board are appointed by the Minister of Health, the Scottish Board of Health, the Governor-General of Northern Ireland, the General Medical Council (3), Direct Vote of the qualified dentists practising in England and Wales, Scotland, and Ireland (3), Direct Representatives by registered dentists not being qualified dentists (2).

Registration of Dental Students.

The General Medical Council's Regulations in regard to the registration of dental students which came into force on Jan. 1st, 1923, provide that the registration of dental students shall be carried on at the General Medical Council Office in London, in the same manner as that of medical students, and be subject to the same regulations as regards age and preliminary examinations; but in the case of dental students professional study may commence either at a recognised dental hospital or school, or by pupilage with a registered dental practitioner.

Candidates for a diploma in dental surgery should produce certificates of having been engaged for at least four years in professional studies, and of having received during 24 calendar months instruction in dental mechanics. It is recommended that instruction in dental mechanics be taken at a recognised dental hospital and school. If any part of such instruction be taken by the candidate as a pupil with a registered dental practitioner, the time required to be devoted to it shall be at least twice the time required for the corresponding instruction taken at a dental school. Two years' *bona-fide* apprenticeship with a registered dental practitioner, after registration as a dental student, may be counted as one of the four years of professional study. When a student can show evidence of regular pupilage in dental mechanics to a registered dental practitioner, prior to the passing of the prescribed preliminary and scientific examinations, he may be allowed to antedate his registration for a period not exceeding one year prior to the passing of these examinations.

The Offices.

The address of the Registrar, to whom further communications should be addressed, is as follows: The Registrar of the General Medical Council, 44, Hallam-street, Portland-place, London, W. 1. The offices of the Dental Board are adjoining.

A memorandum on the procedure to be adopted by those who desire to enter the profession of medicine, with notes on costs and prospects, and a similar Memorandum in regard to Dentistry, may be obtained on payment of 1s. each.

THE MEDICAL EXAMINING BODIES AND SCHOOLS OF THE UNITED KINGDOM.

A GUIDE TO THE FACILITIES FOR OBTAINING THE VARIOUS MEDICAL DEGREES AND OTHER QUALIFICATIONS FOR THE BRITISH MEDICAL REGISTER.

I.—ENGLAND AND WALES.

THE UNIVERSITIES.

UNIVERSITY OF OXFORD.

THERE are two degrees in Medicine, *B.M.* and *D.M.*, two in Surgery, *B.Ch.* and *M.Ch.*, and diplomas in *Public Health** and *Ophthalmology*. The examinations are open to men and women alike.

Only Graduates in Arts of the University are eligible for the Medical and Surgical degrees. The most convenient course for the B.A. degree for intending graduates in Medicine is to take Responsions, the Preliminary Science Examinations mentioned below, and the Final Honour School of Physiology. To obtain the degrees of B.M. and B.Ch. the following examinations must be passed: 1. Preliminary subjects: Physics and Chemistry, Zoology, and Botany. 2. Professional. (*a*) First Examination: Subjects—Organic Chemistry, unless the candidate has satisfied the examiners in Part I. Chemistry in the Honour School of Natural Science; Human Physiology, unless he has obtained a First or Second Class in Animal Physiology in the Honour School of Natural Science; Human Anatomy. (*b*) Second Examination: Subjects—Medicine, Surgery, Midwifery, Pathology, Forensic Medicine with Hygiene, Materia Medica and Pharmacology. The First and Second Professional examinations are held in June and December. The first B.M. examination may be passed at any time after the Preliminary Scientific examinations. Anatomy and Physiology must be passed at the same time—Organic Chemistry may be taken separately.

At any time after passing *First B.M. Examination*, the candidate can, on producing certificates, present himself for examination in the subjects of Pathology, Forensic Medicine with Hygiene, Materia Medica and Pharmacology; but cannot, unless he is already a registered medical practitioner, enter for examination in Medicine, Surgery and Midwifery until the eighteenth term from his matriculation, nor until a period of at least thirty-three months has elapsed from the date of passing the First B.M. Examination. He must pass in Medicine, Surgery and Midwifery at one and the same time.

Before admission to the Examinations in Pathology and Bacteriology, and Materia Medica and Pharmacology, of the *Second B.M. Examination*, the student must produce certificates of having attended courses of instruction including practical work in Pathology, Bacteriology, Post-mortem Clerking, Pharmacology, and Pharmacy, either in Oxford or in a recognised Medical School. Before admission to the remainder of the second B.M. Examination, he must produce a number of other certificates, including certificates of having acted as Clinical Clerk and Dresser, each for six months in the Wards, of instruction in Midwifery and of attendance on Labours, of instruction in Infectious Diseases and in Ophthalmology, of proficiency in Vaccination and in the administration of Anæsthetics, and of three academic years of hospital practice.

The degree of Bachelor of Surgery (B.Ch.) is granted with that of B.M. after passing the above examinations.

* Suspended until further notice.

The degree of Doctor of Medicine (D.M.) is granted to Bachelors of Medicine of the University who have entered upon their thirtieth term from Matriculation, and have submitted a dissertation which is approved by the examiners for the B.M. degree whose subjects are dealt with therein and by Professors in the Faculty of Medicine. The degree of Master of Surgery (M.Ch.) is granted after examination to Bachelors of Surgery who have entered upon their twenty-first term, and who are members of the surgical staff of a recognised hospital, or have acted as dresser or house surgeon in such a hospital for a period of six months. The examination, which includes Surgery, Surgical Anatomy and Pathology and Surgical Operations, is held annually in June, after the Second B.M. examination.

Travelling Fellowship, Scholarships, and Prizes.—A Radcliffe Travelling Fellowship is awarded annually after an examination held in February. It is tenable for two years and of the annual value of £300. The examination is in Physiology, Pathology, and Hygiene, and is partly "practical." Candidates must be graduates in Medicine of the University. The holder must travel abroad for the purpose of medical study. Application should be made to the Radcliffe Examiners, Department of Medicine, University Museum. A Schorstein Research Fellowship of the value of £200 a year, tenable for two years, is offered in alternate years. Candidates must be graduates of the University, under 35 years of age, and must hold a registrable medical qualification. Their research must be carried out in one of the Medical Departments at Oxford. A Christopher Welch Scholarship of £100, tenable for four years, is awarded annually after examination. Candidates must be men undergraduate members of the University, who have not exceeded the twelfth term from their matriculation, or been admitted to any degree in the University. They may offer any one of the subjects, Animal Physiology, Botany, Zoology. A George Herbert Hunt Travelling Scholarship of the value of about £100 is awarded every second year to enable a Bachelor of Medicine to undertake three months' study abroad. A Rolleston Memorial Prize is awarded once in two years to members of the Universities of Oxford and Cambridge of not more than ten years' standing for an original research in some Biological subject, including Physiology or Pathology. The Radcliffe Prize, founded by University College (1907). is of the value of £50 and is awarded biennially (alternating with the Rolleston Memorial Prize) for research in some branch of medical science. The Theodore Williams Scholarships, each of the value of £50 a year for two years, are awarded annually in the subjects of Anatomy, Physiology, and Pathology. A Radcliffe Scholarship in Pharmacology, of the value of £50 for one year, is awarded annually by the Master and Fellows of University College. A King's College Hospital Burney Yeo Scholarship of £80 is awarded each year on the nomination of the Regius Professor of Medicine. The Scholarships and Exhibitions in Science which are offered by most Colleges are open to those who intend to pursue Medicine. The value of these scholarships varies, according to the Candidate's need, between £30 and £100 a year; the exhibitions vary in value from £30 to £100 per annum. The number of scholarships and exhibitions in Science offered annually is about forty. There are also Medical Scholarships of the value of £100 a year at University College and at Pembroke College. The Welsh Memorial Prize for Anatomical drawing is awarded annually, and is of the value of about £10.

More detailed information may be obtained from the University Calendar; from the Examination Statutes, 1929; from the Regius Professor of Medicine; from the Professors in the departments of medical science; and from the Dean of the Medical School, Oxford.

UNIVERSITY OF OXFORD: RADCLIFFE INFIRMARY AND COUNTY HOSPITAL.—225 beds. Courses of instruction are given in connexion with the Oxford

University Medical School. These include (1) a course in Practical Medicine by the Regius Professor of Medicine; (2) clinical lectures by the Litchfield Lecturers in Medicine and Surgery; and (3) tutorial instruction and demonstrations in special Regional Anatomy (medical and surgical), methods of Medical and Surgical Diagnosis, and Surgical Manipulation. (4) Pathological demonstrations and instruction in post-mortem work are given by the Assistant Pathologist. Opportunities are offered to students who wish to act as surgical dressers and clerks. A post-graduate course is held in the hospital in the autumn of each year.

UNIVERSITY OF CAMBRIDGE.

There are two degrees in Medicine, *M.B.* and *M.D.*, two in Surgery, *B.Chir.* and *M.Chir.*, and Diplomas in *Public Health*, *Hygiene*, *Tropical Medicine* and *Hygiene*, and *Medical Radiology and Electrology*. Students of Girton or Newnham College are admitted to the *M.B.* Examinations.

The student must enter a College, or become a Non-Collegiate student, and keep nine terms (three years) by residence. He must pass the Previous Examination of the University before he comes into residence or therefrom obtain exemption, particulars of which may be obtained from the Registrary. He may then devote himself to medical study in the University. Or he may, as nearly all students now do, proceed to take a degree in Arts by passing the Examinations for the Ordinary B.A. degree, or an Honours degree by passing a Tripos Examination. The Natural Sciences Tripos is taken most frequently by medical students, as some of the subjects are practically the same as those for the First and Second M.B. Examinations.

For the degree of Bachelor of Medicine (*M.B.*) five calendar years of medical study are required either in Cambridge or at one of the recognised Schools of Medicine. The first three years are spent in Cambridge till the student has passed the examination for Part I. of the Natural Sciences Tripos and the *First and Second M.B. Examinations*. Hospital practice may be attended at Addenbrooke's Hospital, Cambridge, after the student has passed Parts I. and II. of the *Second Examination*. The laboratories for Botany, Chemistry, Physics, Biology, Zoology, Human Anatomy, Physiology, Biochemistry, Pathology, Bacteriology, Pharmacology, Psychology, and Public Health are well equipped. Addenbrooke's Hospital, the Infectious Diseases Hospital, the Cambridge Research Hospital, and the Field Laboratories are utilised for study and research.

There are three examinations for M.B. The *First* includes (1) General and Inorganic Chemistry, (2) Mechanics, (3) Physics, and (4) Elementary Biology. These parts may be taken together or separately. The *Second* is divided into three parts—viz. (1) Organic Chemistry, (2) Human Anatomy and Physiology, and (3) Pharmacology and General Pathology. The *Third* is divided into two parts: (1) Principles and Practice of Surgery (including Special Pathology and Midwifery and Diseases Peculiar to Women); and (2) Principles and Practice of Physic (including Diseases of Children, Mental Diseases, Medical Jurisprudence), Pathology (including Hygiene and Preventive Medicine), and Pharmacology (including Therapeutics and Toxicology). The examinations are partly in writing, partly oral, and partly practical, in the hospital, in the dissecting room, and in the laboratories. An Act has then to be kept by the candidate reading an original dissertation composed by himself and being examined orally on some subject approved by the Regius Professor of Physic. Candidates who have passed both parts of the Third M.B. examination are admitted to the registrable degree of Bachelor of Surgery (B.Chir.) without separate examination and without keeping an Act.

The degree of Doctor of Medicine (M.D.) may be taken three years after that of M.B. or four years after that of M.A. The candidate is required to produce certificates of having been engaged in Medical Study for five calendar years, and if an M.A. to pass the same examinations as are required for the degree of M.B. An Act has to be kept, consisting of an original Thesis with *viva voce* examination; and a short extempore essay has to be written on a topic taken from the general subject of his thesis, whether it be Physiology, Pathology, Pharmacology, the Practice of Medicine, State Medicine, or the History of Medicine.

Candidates for the Degree of Master of Surgery (M.Chir.) who are M.A.'s may be admitted to the examination after they have become legally qualified under the *Medical Acts* to practise surgery. Others may be admitted to the examination when two years at least have elapsed after they have completed all that is required of candidates for the Degree of B.Chir. Candidates are required to pass an examination in Principles and Practice of Surgery, Surgical Anatomy and Surgical Operations, and Pathology, and to write an extempore essay on a Surgical Subject.

Diplomas are granted in Public Health, in Hygiene, in Tropical Medicine and Hygiene, and in Medical Radiology and Electrology. Candidates must hold a recognised medical qualification. (See p. 470.)

Scholarships and Prizes.—Medical studies are endowed by the numerous Natural Science scholarships at the various colleges, information about which can be obtained from the respective Tutors. There are Natural Science scholarships at most of the Colleges and prizes in the ancillary medical subjects. Some of these are entrance scholarships; some may be gained by students already in residence, and where suitable candidates are not forthcoming among such students the emoluments may be allotted to members of other Colleges. Valuable scholarships instituted on behalf of Medicine are the Tancred Studentships in Physic, tenable at Gonville and Caius College. The successful candidates must enter at the college within a month or remove there if they are members of any other college. Students are required to take the degree of M.B. as soon as they are of sufficient standing but may hold a Studentship for a further three years. Thus a student elected previous to admission to college can draw the emolument, the annual value of which is about £100, for eight years. Full particulars can be obtained from Mr. E. T. Gurdon, 28, Lincoln's Inn-fields, London. Among other scholarships and prizes may be mentioned the Balfour Studentship, for research in Biology, of the value of £300 a year for three years, not restricted to members of the University; the Frank Smart Studentship and Prizes for Botany and Zoology, and the Shuttleworth Studentship for Zoology or Physiology tenable at Gonville and Caius College. The one University prize in Medicine, the Raymond Horton Smith Prize, is awarded to that candidate for the degree of M.D. who presents the best thesis for the degree during the academical year, provided that he has taken honours in a Tripos Examination.

An abstract of the Regulations and Schedules of the range of the examinations in Chemistry, Mechanics, Physics, Biology, Pharmacology, and General Pathology may be obtained upon application to the Registrary, The Registry, Cambridge.

ADDENBROOKE'S HOSPITAL.—Over 200 beds. Clinical Lectures in Medicine and Surgery, in connexion with Cambridge University Medical School, are given at this hospital twice a week during the academical year; and practical instruction in Medicine and Surgery is given in the wards and out-patients' rooms by the physicians and surgeons daily during the term time and vacations. The fee for pupilship is 3 guineas a term, 9 guineas a year, 12 guineas perpetual. Further information may be obtained from Dr. Aldren Wright.

UNIVERSITY OF LONDON.

The University of London in 1900 was reconstituted under the Act of Parliament, 1898, and became a teaching as well as an examining body. Under the developments upon the Internal side all the metropolitan medical schools became constituent colleges, while Clinical Units have been established at St. Bartholomew's, the London, St. Mary's, St. Thomas's, University College Hospital, and the Royal Free Hospital.

Internal and External Students.—All the examinations of this University are open to men and women alike. Matriculated students of the University may be either internal or external. Internal students of the University are students who are registered as pursuing a prescribed course of study, or an approved course of research, in a school of the University, or under teachers of the University. Centres for preliminary and intermediate medical studies have been established by the University at University and King's Colleges. External students in addition to matriculating must register as preparing for an examination leading to a Degree or Diploma within the purview of the Council for external students.

UNIVERSITY COLLEGE.—University College has been constituted a University centre for the teaching of medical sciences. The College Faculty of Medical Sciences comprises the Departments of Physics, Chemistry, Botany, and Zoology (the Preliminary Medical Sciences); also the Departments of Anatomy, Histology, Physiology, Biochemistry, and Pharmacology (the Intermediate Medical Sciences). Research work is undertaken in all departments. The completion of the building scheme by the erection of the section for Anatomy, Histology, and Embryology, together with further extensions to the Department of Physiology, which the generosity of the Rockefeller Foundation made possible, provides exceptional facilities for research and post-graduate study in anatomy, physiology, and pharmacology. In particular might be specified the opportunities for investigation in human and comparative embryology and neurology, in histology, radiology, anthropology, biochemistry, and experimental physiology and experimental embryology. Arrangements exist for the close correlation of the work of the Faculty with University College Hospital and Medical School. Women students are admitted.

Scholarships and Prizes.—The first four items on the present list require a complete intermediate course at University College. The money value and subjects at examinations are as follows: (*a*) The Bucknill Scholarship, 160 guineas; (*b*) and (*c*) two Entrance Exhibitions, 55 guineas each, Chemistry, Physics, Botany, and Zoology; (*d*) Entrance Scholarship, £30 a year for three years; (*e*) Cluff Memorial Prize, £15 biennially, Anatomy, Physiology, Pharmacology, and Chemistry; (*f*) Schafer Prize in Physiology, £18 triennially; (*g*) Sharpey Physiological Scholarship, £115, Biological Sciences; (*h*) Bayliss-Starling Scholarship, £120 a year, Physiology, Biochemistry; (*j*) Morris Bursary for sons of deceased professional men, by nomination, tenable for two years, £20 a year; and (*k*) five Gold and five Silver Medals awarded annually in various departments. For further information apply to the Secretary, University College, Gower-street, London, W.C.1.

KING'S COLLEGE.—The Medical Faculty at this College gives instruction in the subjects of Medical Science for the Preliminary and Intermediate Examinations in Medicine and Surgery, and Dental Surgery, of the University of London and of other Universities and examining bodies, to students entering the College directly, and also to students of the following four hospital schools which prepare only for the final examinations—viz., King's College Hospital, Westminster Hospital, St. George's Hospital, and Charing Cross Hospital. The Faculty is open to both men and women.

Scholarships and Prizes.—Two or more Warneford Entrance Scholarships of £30 each for four years. Examination in April, subjects selected from Divinity, Classics, Science. Sambrooke Scholarship of £30 for three years. Examination in April, subjects selected from Classics, Science. Worsley Scholarships: £100 in five annual instalments of £20. *At the end of the First Year* of study, the Rabbeth Scholarships (£30 and £15), the Carter Gold Medal and Prize in Botany, and the Hare Prize in Zoology are open for competition. *At the end of the Second Year*, the Second Year's Scholarship (£20) is open for competition. *At the end of the Third Year*, the Hughes Prize in Anatomy, the Huxley Prize in Physiology, the Inchley Prize in Pharmacology, and the Jelf Medal are open for competition. The Layton and the Berridge Research Studentships (£150 per annum each), the Daniell Scholarship in Chemistry (£40), Warneford Prizes (£25 and £15), Leathes Prize, Barry Prize, &c., are also open to Students of this Faculty. The majority of the Scholarships and Prizes are open to Regular Students only. For further information apply to the Dean of the Medical Faculty.

Medical students of the University of London, who are pursuing their medical curriculum in the metropolis will proceed to one of the recognised medical schools connected with the University. At four of these schools the preliminary studies will be taken at King's College, while at the other schools the whole curriculum can be taken out in connexion with the selected hospital. These hospitals are St. Bartholomew's Hospital, Charing Cross Hospital, St. George's Hospital, Guy's Hospital, King's College Hospital, the London Hospital, St. Mary's Hospital, the Middlesex Hospital, St. Thomas's Hospital, University College Hospital, Westminster Hospital, and the London (Royal Free Hospital) School of Medicine for Women. Various schools and hospitals are also recognised as schools of the University in special departments, and students may pursue their studies at other approved universities and medical schools, presenting themselves for examination at the University.

Faculty of Medicine.

The Faculty of Medicine of the University grants the joint degrees of M.B., B.S. (*Bachelor of Medicine and Surgery*), the higher separate degrees of M.D. (*Doctor of Medicine*) and M.S. (*Master of Surgery*), and the degree of B.D.S. (*Bachelor of Dental Surgery*) and the degree of B.Pharm. (*Bachelor of Pharmacy*); the two higher degrees being open only to candidates holding the M.B., B.S degrees of the University. The curriculum for the M.B., B.S. degrees is five and a half years from the time of matriculation, with certain exceptions which must be looked for in the official regulations of the University.

A. *Internal Students.*—For the Bachelor's degrees in Medicine and Surgery a student must normally, after registration as an internal student, have: (1) Attended prescribed courses of study for five and a half years in one or more schools of the University. (2) Passed the following examinations, under the conditions mentioned below: (*a*) The First Examination for Medical Degrees in Inorganic Chemistry, Physics, including Mechanics, and General Biology; (*b*) the Second Examination for Medical Degrees: Part I., Organic Chemistry; Part II., Anatomy, Physiology, and Pharmacology; (*c*) the Third Examination for Medical Degrees, or M.B., B.S. Examination in Medicine, Surgery, Obstetrics and Gynæcology, Pathology, Forensic Medicine, and Hygiene.

B. *External Students.*—For the Bachelor's degrees in Medicine and Surgery an external student must (1) have passed the Matriculation examination or have been exempted therefrom under Statute 116 not less than five and a half years previously; (2) have passed subsequent examinations similar to those required of an internal student; and (3) have been engaged in professional studies during the five and a half years subsequently to Matriculation and four and a half years subsequently to passing the First Examination

for Medical Degrees at one or more of the medical institutions or schools recognised by this University for the purpose, one year at least of the four and a half years to have been spent in one or more recognised institutions or schools in the United Kingdom.

The First Examination for Medical Degrees (*Inorganic Chemistry, Physics, including Mechanics, and General Biology*) will take place twice in each year, commencing on the Monday following Dec. 7th and on the first Monday in July. It must be passed not less than nine months after matriculation.

The Second Examination for Medical Degrees (*Part I.*) *: Organic Chemistry.*—This examination will take place twice in each year, commencing on the Thursday following the second Monday in March and on the Thursday following the first Monday in July. No candidate will be admitted to this examination until he has completed the First Examination.

The Second Examination for Medical Degrees (*Part II.*) takes place twice in every year, commencing on the Tuesday following the third Monday in March and on the Tuesday following the first Monday in July. No candidate shall be admitted to the examination unless he has passed the First Examination for Medical Degrees at least 18 months previously, and has passed Part I. of the Second Examination for Medical Degrees.

The Third or M.B., B.S. Examination.—The M.B., B.S. examination takes place twice in each year, commencing on the second Monday in November and on the first Monday in May. No candidate will be admitted to this examination unless he has completed the Second Examination for Medical Degrees, together with a course of study summarised below, nor within three years from the date of passing the Second Examination, Part II., in Anatomy and Physiology. The course of study comprises introductory course in (1) Clinical Medicine; (2) Clinical Surgery; and (3) Clinical Pathology; (4) Experience as Clinical Clerk; (5) Clinical Medicine; (6) (*a*) Fevers, (*b*) Children's Diseases, (*c*) Venereal Diseases, (*d*) Mental Diseases (at a recognised Asylum), (*e*) Dermatology, (*f*) Vaccination, (*g*) Materia Medica and Pharmacy; (7) Experience as a Surgical Dresser; (8) Clinical Surgery; (9) Ophthalmology; (10) Oto-Rhino-Laryngology; (11) (*a*) Operative Surgery, (*b*) Applied Anatomy, (*c*) Administration of Anæsthetics, (*d*) Dental Surgery, (*e*) Orthopædic Surgery; (*f*) Mechano-therapeutics; (12) Obstetrics and Gynæcology; (13) Lying-in Hospital; (14) The conduct of at least 20 Labours; (15) Antenatal Clinic; (16) Experience as a Clinical Clerk in Gynæcological Work; (17) General Pathology, Morbid Anatomy, Bacteriology, and Chemical Pathology; (18) Work in the Post-Mortem Room; (19) Clinical Laboratory; (20) Forensic Medicine; (21) Hygiene. He must have attended the Medical and Surgical Practice of a recognised hospital for two years, and have held the posts of clinical clerk and surgical dresser for periods of six months each. Candidates will be examined in Medicine, Pathology, Forensic Medicine and Hygiene, Surgery, Obstetrics and Gynæcology. The subjects may be divided into two groups—namely: (1) Medicine, Pathology, Forensic Medicine, and Hygiene; and (2) Surgery, Obstetrics, and Gynæcology. These groups may be taken either separately or together. Bachelors of Medicine who graduated before May, 1904, may obtain the B.S. by passing the Surgical part of the M.B., B.S.

Doctor of Medicine.—The examination for this degree takes place twice in each year, commencing on the second Monday in December and on the first Monday in July. Candidates may present themselves for examination in one of the following branches—namely: (1) Medicine; (2) Pathology; (3) Psychological Medicine; (4) Midwifery and Diseases of Women; (5) State Medicine; and (6) Tropical Medicine. Any candidate for the degree of M.D. (except in branch 5) may transmit to the Registrar a thesis for approval and may be exempted from a part or from the whole of the written examination.

Master of Surgery.—The examination for the degree of Master of Surgery takes place twice in each year: (1) Surgery; (2) Dental Surgery; (3) Ophthalmology; (4) Laryngology, Otology, and Rhinology. A thesis may be submitted as for M.D.

Doctor of Philosophy.—A Degree of Ph.D. has been instituted in non-clinical subjects for External Students in the Faculty of Medicine. Candidates for this degree must hold, in a branch of study akin to that in which they propose to proceed to the Ph.D. Degree, the Degree of M.B., B.S., or B.D.S., or B.Pharm., or B.Sc.

Bachelor of Pharmacy.—The course extends over three years.

Full details of the prescribed curricula can be obtained free on application to the Academic Registrar, or for External Degrees from the External Registrar, University of London, South Kensington, S.W. 7.

MEDICAL SCHOOLS OF THE UNIVERSITY OF LONDON.[1]

ST. BARTHOLOMEW'S HOSPITAL AND COLLEGE.—The hospital contains 757 beds, of which 687 are for patients in the hospital at Smithfield and 70 at the Alexandra Hospital, Swanley. Special departments have been organised for Diseases of Women and Children, the Eye, Ear, Larynx, and Skin, as well as for Orthopædic and Dental Surgery, and for Electro-therapeutics and X Ray work. Whole-time Clinical Units under Professors of Medicine and Surgery have been established. A new Surgical Block of ten wards, with accommodation for 250 patients, and connected with a block of five new operation theatres is nearing completion, and will be ready for use about January 1930.

Ten house physicians and ten house surgeons are appointed annually, are provided with rooms and board, and receive £80 a year as salary. A resident midwifery assistant, an ophthalmic house surgeon, and a house surgeon for diseases of the throat, nose, and ear, and a house surgeon for orthopædic surgery are appointed every six months, and are provided with rooms and board and receive a salary of £80 a year. Three resident administrators of anæsthetics are appointed, the senior for one year at a salary of £150, and two juniors for six months with a salary at the rate of £80 per annum, with board and rooms. An extern midwifery assistant is appointed every three months, and receives a salary of £80 a year. The clinical clerks, the obstetric clerks, the clerks to the medical out-patients, the dressers to the surgical in-patients and to the out-patients, and the dressers in the special departments are chosen from the students. A residential College is attached to the hospital.

There are quarters for the resident staff, casualty, medical, surgical, and special out-patient departments, casualty wards, dispensary, and clinical lecture theatre. There is a chemical laboratory attached to the College as well as a laboratory devoted to instruction in Public Health. A block is devoted to Pathology, and contains the post-mortem room as well as extensive laboratories for bacteriology, clinical pathology, and pathological chemistry. *The Medical College Buildings* include three large lecture theatres, a large dissecting room, laboratories for chemistry, biology, morbid anatomy and histology, and public health, as well as a spacious library (containing 14,500 volumes), a well-appointed museum of anatomy, physiology, comparative anatomy, materia medica,

[1] Of these schools that of the Royal Free Hospital is reserved for women; University College admits men and women to the whole course, the number of women being limited; King's College admits men and women to the intermediate subjects; the remainder admit men only.

botany, and pathological anatomy. The pathological museum is complete. A new block in Giltspur-street has recently been acquired and has been fitted up as lecture theatres and laboratories for physics, chemical physiology, experimental physiology, histology, and pharmacology.

Special Classes for the Primary and Final F.R.C.S. are held twice yearly. *Instruction in Preliminary Science* is given to University of London students in chemistry, biology, and physics throughout the year. Facilities for research work are afforded in the Clinical Units and Laboratories of pathological and other departments.

Scholarships given in aid of Medical Study.—For five of the Scholarships and the Exhibition—namely, (*a*), (*b*), two Entrance Scholarships in Science of the respective values of £75 and £100; (*c*) Entrance Scholarship in Arts, £100; (*d*) Jeaffreson Exhibition, £50; and (*e*) Shuter Scholarship, £50—a full or University course at St. Bartholomew's Hospital is required. The awards of (*a*) and (*b*) are made after examination in selections from the subjects of Chemistry, Physics, Zoology, Botany, Physiology, Anatomy, and Pathology; (*c*) and (*d*) are awarded after examination in Mathematics, Latin or Greek or French or German, a second language or Chemistry or Physics; (*e*) is awarded after competitive examination among Cambridge Graduates in Anatomy and Physiology. The more important of the other Scholarships and prizes are as follows:—Four Junior Scholarships—(*f*) No. 1, £30, Anatomy and Physiology; (*g*) No. 2, £20, Anatomy and Physiology; (*h*) No. 3, £25, Chemistry, Physics, and Biology; (*i*) No. 4, £15, Chemistry, Physics, and Biology; (*j*) Senior Scholarship, £50, Anatomy, Physiology, and Chemistry; (*k*) Kirkes Scholarship, £30 and medal, Clinical Medicine; (*l*) and (*m*) two Brackenbury Scholarships, £39 each, one in Medicine and one in Surgery; (*n*) Sir G. Burrows Prize, 10 guineas, Pathology; (*o*) Skynner Prize, 13 guineas, Regional and Morbid Anatomy; (*p*) Matthews Duncan Medal and Prize, £20, Midwifery and Gynæcology; (*q*) Luther Holden Research Scholarship in Surgery, awarded by election, £105; (*r*) Lawrence Research Scholarship and Gold Medal in Pathology, awarded by election, £115; and (*s*) Baly Scholarship in Clinical Medicine, £75, awarded by examination.

The recreation ground of 10 acres is at Winchmore Hill for the use of the members of the Students' Union, which all students are expected to join. The Students' Union contains a large reading and smoking room, a committee and writing room, luncheon and dining hall, and a miniature rifle range.

Information may be obtained on application to the Dean of the Medical College: Dr. T. W. Shore. The Warden of the Residential College is Mr. R. M. Vick.

CHARING CROSS HOSPITAL.—The Hospital, to which the School is attached, contains 300 beds. There are special departments for Mental Diseases, Midwifery, Diseases of Women, of Children, of the Skin, Ear, Throat, Nose, and Teeth, for Orthopædic Cases, X Ray work, and for Electrical Treatment.

In the Medical School Demonstratorships and Assistant Demonstratorships are open to students of the School. Six House Physicians, six House Surgeons, two Obstetric and Gynæcological House Surgeons, and two House Surgeons to the Special Departments are appointed annually. The large proportion of resident appointments to the number of students makes it probable that a student of ordinary ability will be able to obtain one of these appointments.

The following appointments are open to students after they have held resident appointments: Resident Medical Officer, at a salary of £400 per annum; Registrar to the Medical, Surgical, Obstetrical and Ear, Nose, and Throat Departments, at £150 per annum.

By an agreement with the University of London the School sends its Primary and Intermediate Students to receive their lectures and practical work at King's College, which is situated within four minutes' walk.

Final studies are taken in the school and hospital, where systematic lectures, demonstrations, and tutorial classes are arranged to cover all the subjects necessary for qualifying examinations. Departments are also available for other final subjects of Materia Medica and Operative Surgery.

An Institute of Pathology with a whole-time staff of scientific workers and fully equipped laboratories has been established. Students receive their training in Preventive Medicine, Pathology, Bacteriology, and Biochemistry here, and are encouraged to undertake research. Special facilities are available for post-graduate research and study.

The course in Ophthalmology is given in the Royal Westminster Ophthalmic Hospital. Special demonstrations are arranged for Post-graduates.

One Epsom School Scholarship, two Oxford and Cambridge Scholarships, and one Scholarship in Anatomy and Physiology open to students of King's College, are offered for competition each year. In addition there are a number of Exhibitions.

The Museum contains over 4000 specimens, including a notable collection of over 800 gynæcological specimens, the Cuthbert Lockyer Collection.

The social comfort and convenience of students are met by library, reading, and smoking-rooms, refreshment-room, in a Students' Club. The Club, which is under the control of a committee of students, provides needful athletic recreation, and includes also a medical society.

Further information may be obtained on application to the Dean, Dr. F. H. Young.

ST. GEORGE'S HOSPITAL.—This hospital has a service of 436 beds, of which 180 are allotted to surgical, 150 to medical cases, and 100 are at the Convalescent Hospital at Wimbledon. There are all the usual special clinical departments. One ward is set apart for Diseases Peculiar to Women, and there is a Maternity Ward of 11 beds. Children's beds are placed in the women's wards. There are two ophthalmic wards.

Twelve house physicians, 12 house surgeons, and 12 casualty officers are appointed annually. Special attention is directed to the following paid appointments, among others, which are open to students after they have held house office:—Resident Assistant Physician and Resident Assistant Surgeon, at £250 per annum each; Medical Officer to the Atkinson-Morley Convalescent Hospital, at £300 per annum; Medical Registrarship at £200 per annum, Surgical Registrarship at £200; Assistant Curatorship of the Museum at £100; Obstetric Assistantship (Resident) at £50; the post of Resident Anæsthetist at £100; the posts (3) of Junior Anæsthetists, each at £30.

Entrance Scholarships and Endowed Prizes of a total value of £700 are awarded annually; a detailed list is placed below. The entire teaching and laboratories are now devoted to purely clinical subjects, and arrangements have been made with the authorities of King's College for students who enter the first, second, or third year of the curriculum as students of St. George's to carry out the necessary courses of instruction at that College. Students then complete their course, without payment of any entrance fee, in a school entirely devoted to clinical work.

Scholarships and Prizes.—At this school five entrance scholarships are given, the money value and the subjects of examination being as follows: (*a*) and (*b*) two William Brown Exhibitions, £120 and £80 respectively; (*c*) and (*d*) two University Entrance Scholarships, 90 guineas and £70 respectively; (*e*) Devitt-Pendlebury Scholarship, £50, Anatomy and Physiology, except in the case of (*c*), subject of examination for which is General Pathology.

This year, in addition to these Scholarships, Exhibitions, each of the value of £40 and up to six in number, will be awarded to candidates of approved merit in the Entrance Scholarships Examination. The others are as follows: (*f*) Allingham Scholarship in Surgery for Students qualified not more than two years, £85; (*g*) and (*h*) two Brackenbury Prizes, one in Medicine and one in Surgery, £33 each, open to students of not more than five years' standing; (*i*) H. C. Johnson Memorial Prize, £19, Practical Anatomy; (*j*) Pollock Prize, £23, Physiology, Physiological Chemistry, and Histology; (*k*) Clarke Prize, £5; (*l*) Thompson Medal, £9, Clinical Reports; (*m*) Brodie Prize, £8, Clinical Reports; (*n*) Webb Prize, open to perpetual pupils, £34, Bacteriology; (*o*) Sir Francis Laking Memorial Prize, £65, open to students having registrable qualifications.

The St. George's Hospital Club, with smoking- and luncheon-rooms on the hospital premises and an athletic ground at Wimbledon, is an amalgamation of the Hunterian Society, the *Gazette*, and the Rugby football, cricket, lawn tennis, boxing, rifle, and golf clubs. Students have the advantage of a library of medical and scientific books which is kept up to date.

Further information may be obtained from the Dean of the Medical School, Dr. A. Feiling.

GUY'S HOSPITAL, LONDON BRIDGE, S.E.1.—This hospital contains 646 beds. The whole of the medical school has been rebuilt within recent years. It provides ample accommodation, with modern equipment for all the non-clinical subjects of the medical curriculum.

The following special departments are attached to the hospital: Departments of ophthalmology, laryngology, gynæcology, diseases of children, diseases of the nervous system, dermatology, otology, actinotherapeutics, anæsthetics, dentistry, orthopædics, vaccine, tuberculosis, genito-urinary and venereal diseases, Salomon's Welfare Centre (for Maternity and Children). Dresserships and clerkships in the various special departments are held by students in turn.

There is a Venereal Clinic, in accordance with the Scheme of the Local Government Board and London County Council. Lectures and clinical instruction are given, to which Medical Students and Practitioners are admitted without fee.

House physicians, house surgeons, out-patient officers, assistant house surgeons, obstetric residents, house surgeons in the departments of ophthalmology, laryngology, and genito-urinary diseases, house physicians in the department for diseases of children, and clinical assistants are appointed from among recently qualified students according to merit.

Scholarships.—Six entrance scholarships are awarded annually as follows:—(*a*) one War Memorial scholarship, of the value of £200, to be awarded alternately in Arts and Science (next award, June or July, 1930 in Science); (*b*) one Open Arts Scholarship of £100 for students under 19 years of age; candidates are required to take English and any two of the following subjects: Latin, Greek, French, German, and Mathematics; (*c*) one Open Junior Science scholarship for students under 20 years, £100; subjects, any three of the following: Inorganic Chemistry, Physics, Biology, and Mathematics; (*d*) a confined Junior Science scholarship of the value of £100 is offered for competition, annually in June or July, to candidates who have attended the Preliminary Science Classes at this School; (*e*) two open Senior Science scholarships: (1) a War Memorial scholarship of the value of £100, awarded annually in September; (2) an open scholarship of the value of £80, awarded annually in September, for students who have completed the curriculum for, or passed the examinations in, Anatomy and Physiology for a medical degree in any University of the British Empire, and who, during the nine months immediately preceding the Scholarship examination, have not entered as students in any Metropolitan Medical School other than Guy's; subjects, any two of the following: Anatomy, Physiology, Organic Chemistry and Pharmacology, General Pathology.

Within the grounds of the hospital are situated the residential college, with accommodation for 35 students, the students' club, with reading, smoking, luncheon, and dining-rooms, a fives court, and swimming bath. The athletic ground and club house is situated at Honor Oak Park, and can be reached in 15 minutes from the hospital.

Further information, together with full particulars of Scholarships, and a booklet entitled "How to Enter the Medical Profession," will be sent post free on application to the Dean of the Medical School, Guy's Hospital, London, S.E. 1.

KING'S COLLEGE HOSPITAL.—The final subjects in the curriculum are taught at the Medical School of King's College Hospital, which is situated at Denmark Hill, S.E. 5.

The hospital has 400 beds, and provision will ultimately be made for 600. There are special departments for Bacteriology, Children, Clinical Pathology, Dermatology, Gynæcology and Obstetrics, Laryngology, Massage, Neurology, Odontology, Ophthalmology, Orthopædics, Otology, Physical Treatment, Psychological Medicine, Radiology, Rhinology, and Urology, each in charge of a specialist and his staff. Clinics are also held in applied pharmacology, cardiology, and medical chemistry.

Appointments.—The appointments open to students are those of clinical assistant to the special departments; medical, surgical, obstetric, and pathological tutorships; resident casualty officers, house physicians and house surgeons; resident anæsthetist; resident radiologist; bacteriologist; clinical pathologist; pathological, medical, surgical, and obstetrical registrarships. Sixteen resident medical and surgical officers are appointed half-yearly.

Scholarships and Registrarships (those in connexion with King's College have already been enumerated).—Scholarships of the total value of £1145 are awarded annually. These include (*a*) Medical Entrance Scholarships—Science, £50; Anatomy and Physiology, £50; Pathology, £75; (*b*) two Burney Yeo Entrance Scholarships, £80 each, open to students of Oxford and Cambridge on the recommendation of the Regius Professors; (*c*) two Raymond Gooch Scholarships, £120 each, open to students of British Universities on certain conditions; (*d*) an Epsom College Scholarship, value £50 at least, offered annually to a student of Epsom College who has taken the first part of the courses for Medical Degrees at the Universities of Oxford, Cambridge, or London; (*e*) two Seaman Scholarships, each £50 a year for a period not exceeding five years, restricted to the sons of clergymen of the Church of England; (*f*) Senior Scholarship (Clinical Studies), £40. The holders of the Warneford and Sambrooke Scholarships awarded by King's College are required to take the subjects of the preliminary and intermediate examinations at King's College, and the final subjects at King's College Hospital. Three Sambrooke Registrarships, open to matriculated students who have filled certain appointments in hospital.

Prizes.—Tanner Prize, £10, Obstetrics and Diseases of Women; Todd Prizes, First £8 and medal, second £4, for Clinical Medicine; Burridge Prize, £4 4*s.*, Forensic Medicine; Jocelyn Almond Prize, £5 5*s.*, Diseases of Children; Wallis Prize, £10, History of Dentistry; 13 Class Prizes, £3 each.

The King's College Hospital Clubs and Societies Union consists of the Listerian and Musical Societies, the Students' Common Rooms, and the various athletic and sports clubs. The athletic ground, over six acres in extent, is on Dog Kennel Hill, about ten minutes' walk from the hospital. There are also Tennis Courts in the grounds of the Hospital and

of "The Platanes"—a hall of residence for students belonging to the hospital.

The Calendar of the School will be sent on application to either of the following: Dr. H. Willoughby Lyle, Dean; Mr. S. C. Ranner, Secretary of the Medical School.

LONDON HOSPITAL.—The hospital, with its Medical College and Dental School, is situated in Mile End-road, and contains 839 beds. There are special departments for diseases of the Eye, Ear, Nose and Throat, Skin, Teeth, and Pediatric, Orthopædic, Venereal, Radiological, Electro- and Physico-therapeutical and Inoculation Departments.

To each medical and surgical firm throughout the hospital there is attached a First Assistant, who is responsible for instructing the clerks or dressers of the firm in elementary medicine and surgery, and who assists the honorary members of the firm in the preparation of their demonstrations. In the department of Obstetrics and Gynæcology there are two assistants and two resident accoucheurs. Special courses of lectures and demonstrations are arranged in Medicine and Surgery and their ancillary subjects. Opportunities for research are provided under the supervision of the staff.

Owing to the large number of patients more appointments are open to students before and after qualification than at any other hospital. Holders of resident appointments have free board. Special classes are held for the examinations of the University of London, for the Fellowship of the Royal College of Surgeons, for the Membership of the Royal College of Physicians, and for other higher examinations. Special entries for medical and surgical practice can be made.

A Clinical Unit in Medicine, under the charge of a whole-time director, provides for the more elaborate methods of diagnosis and treatment, and takes a leading part in the initiation and coördination of medical research. The director has an assistant director, two assistants, and two house physicians.

Scholarships and Prizes.—The following is a list of the Scholarships and Prizes:—Entrance Scholarships: Price Scholarship £100, and one Scholarship of £50, subjects of First Medical Examination at the University of London; Epsom College Scholarship, free education, subjects of First Medical Examination as above; Price Scholarship, open to students of Oxford and Cambridge Universities, (1) £100, Pathology; (2) £100, Human Anatomy and Physiology; two Open Scholarships, each of the value of £100, subjects, Human Morphology and Embryology, Physiology and Pharmacology, Biochemistry, Pathology, Bacteriology and Morbid Anatomy. Prizes: Buxton Prize, £40, subjects of Anatomy and Physiology; three Prizes for Clinical Work, £20 each, Medicine, Surgery, and Obstetrics and Gynæcology; Sutton Prize, £20, Pathology; Duckworth Nelson Prize, biennial, £10, Practical Medicine and Surgery; Letheby Prizes (2), £25, Chemistry and Chemical Pathology; four Dressers' Prizes, amounting to £20, zeal, efficiency, and knowledge of Elementary Clinical Surgery; Hutchinson Prize, triennial, £60, Clinical Surgery; Treves Prize, £15, Clinical Surgery; two Practical Anatomy Prizes, £6 and £4 respectively; Andrew Clark Prize, £14, Clinical Medicine and Pathology; T. A. M. Ross (Prox. Acc.) Prize, £10 10*s.*, Clinical Medicine and Pathology; James Anderson Prizes (4), £20, Elementary Clinical Medicine; Arnold Thompson Prize, £15, Diseases of Children; and Liddle Prize, triennial, £120.

Medical Research Funds.—Funds to the value of over £113,000 permit of financial assistance being given to students and graduates engaged in Medical Research.

A laboratory for the manufacture of certain preparations of Radium has recently been endowed.

Two Residential Hostels are provided for students, and a hostel for 40 resident medical officers. The Union Athletic Ground, 13 acres, is within easy reach of the hospital.

Dean: Prof. William Wright.

ST. MARY'S HOSPITAL.—The Hospital and Medical School have on one side a poor district of 500,000 persons, and on the other side the residential districts of Kensington and Bayswater. The hospital contains 350 beds, and recent structural additions have added two new operating theatres. By a scheme of affiliation, for teaching purposes, of certain neighbouring hospitals, the teaching facilities extend over 1000 beds. The Medical School provides complete courses of instruction, and students can join at once on passing a Preliminary Examination in Arts. Terms begin in October, January, and April.

Clinical Units in Medicine and Surgery were established in 1920. Lying-in beds have recently been added, and, in addition to this, arrangements have been made by which all students take out a short course of instruction in Practical Midwifery at Queen Charlotte's Hospital without additional fee.

Students specially interested in Pathology and Bacteriology have singular advantages at St. Mary's. The institute comprises seven special departments, the whole being under the personal direction of Sir Almroth Wright. Certain Research Scholarships of £200 each are awarded annually to students working in the departments of the institute; and research beds have been instituted. Clerkships in Pathology, Bacteriology, and Chemical Pathology, lasting for a period of three months, are open to students of the fifth year, and enable them to carry out the Pathological and Bacteriological investigations of the wards, and learn the necessary technique under supervision. Seventy-two of these posts are available annually. Numerous appointments are open to newly qualified members of the Medical School, including ten salaried posts with salaries varying from £200 to £750 per annum. A special Post-graduate course is held during the first week-end in October, and is open to all General Practitioners and other qualified men without fee.

Entrance Scholarships.—Two Entrance Scholarships of the value of £210 each are awarded annually, by nomination in July, the Geraldine Harmsworth Scholarship, £200, and one or more University Scholarships of £200 are awarded in July.

The Athletic ground (10 acres) is situated at Wembley and can be reached in 20 minutes by a constant service of trains. A large pavilion has recently been added.

For further information apply to the Dean of the Medical School.

MIDDLESEX HOSPITAL.—The hospital contains over 360 beds, with special wards for Cancer, Maternity and Gynæcological and Ophthalmological cases, and for Diseases of Children. Other special departments include those for Diseases of the Eye, Ear, Nose and Throat, and Skin; Nervous diseases, Orthopædic cases, Diseases of the Rectum and Venereal Diseases. There is also an Electrotherapeutic department. The Cancer Hospital, containing 92 beds and Special Investigation **Laboratories, offers unrivalled opportunities for the study of Cancer, both in its clinical and pathological aspects. In the Electrotherapeutic Department, students obtain instruction in the Treatment of Lupus and Cancer by the X ray method of treatment.**

All appointments are made without fee of any kind, and the following are appointed at intervals annually: six house physicians, eight house surgeons, two obstetric and gynæcological house surgeons, two casualty medical officers, two casualty surgical officers, one senior resident anæsthetist, two junior resident anæsthetists, and four resident officers to the special departments. Ten registrars are appointed annually. Non-resident qualified clinical assistants are appointed to assist in the various out-patient departments. Clinical clerks and surgical dressers are also appointed in every department.

The Medical School, which includes the Bland-Sutton Institute of Pathology, the Courtauld Institute of Biochemistry, and the Barnato-Joel Laboratories, is fully equipped for the theoretical and practical

teaching of all the subjects of the medical curriculum, for the Diplomas in Public Health, and the University of Cambridge Diploma in Radiology, for which two courses are held yearly. Ample laboratory and class-room accommodation is provided. The teaching staff includes 6 Professors, 32 recognised Teachers, 10 Demonstrators, 4 Tutors. The Bland-Sutton Institute of Pathology and the Courtauld Institute of Biochemistry are completely equipped for routine hospital investigations, teaching and research work, and contains large pathological, bacteriological, and clinical laboratories, also smaller laboratories for individual research work. A well-equipped Anatomical and Pathological Museum and Reference Library offer every facility.

Other features of interest are: the course in Medical Radiology and Electrology, under the direction of the "Joel" Professor of Physics; D.P.H. course, under the direction of Dr. Charles Porter, M.O.H., St. Marylebone, Prof. J. McIntosh, and Prof. W. B. Tuck. A primary F.R.C.S. course is held twice yearly, and also special classes to prepare students for the Intermediate Examinations of the Universities.

Scholarships and Prizes.—Two Entrance Scholarships, value £100 each, and two University Scholarships, value £90 and £60, are awarded annually in September. The successful candidates are required to become general students of the school. A Freer Lucas Scholarship is awarded annually on the nomination of the Headmaster of Epsom College. There are also two Broderip Scholarships, value £60 and £40 respectively; the Lyell Gold Medal and Scholarship, value £55 5*s.*; the John Murray Medal and Scholarship, value £25 (awarded every third year): the Freeman Scholarship, value £30; the Hetley Clinical Prize, value £25; the Leopold Hudson Prize, value 11 guineas; and the Second Year's Exhibition, value 10 guineas. There are also numerous class prizes.

The Students' Amalgamated Clubs include the following: Medical Society, Common Room Society, Musical Society, cricket, football, rowing, chess, lawn tennis, hockey, sailing, and fencing. There are a restaurant and a gymnasium in the school buildings, and large athletic grounds at N. Wembley, with new pavilion.

For further particulars apply to the Dean or the Secretary of the Medical School.

ST. THOMAS'S HOSPITAL.—This Hospital contains 644 beds. There are special departments for the treatment of women, children, diseases of the eye, ear, nose and throat, skin, teeth, and for orthopædics. Nervous and mental diseases are treated in special departments. An electrocardiograph has been installed for the investigation of diseases of the heart. The Tuberculosis Department forms a part of the Lambeth scheme for treatment of patients and for instruction. The Venereal Department has been established as part of the London County Council scheme. Departments for Radiology, Electrotherapy, Phototherapy, Massage and Remedial Physical Exercises are also special features. A speech clinic has been inaugurated in connexion with the Children's Department. Exceptional facilities are offered in the hospital laboratories for the study of General Pathology, Clinical Pathology, Chemical Pathology, and of Treatment by Serums and Vaccines. Surgical operations take place in the main theatres every day, except Saturdays, at 2 P.M. Clinical teaching in the wards, out-patients' and special departments, is available every day of the week. Clinical lectures are delivered every Wednesday during the sessions. A Clinical Unit in Medicine has been established.

All appointments in the hospital are open to students without extra fee. Clinical clerks and dressers for in- and out-patients are selected from students who have completed their third years' work. Every student acts as clerk in the post-mortem room and in one of the pathological laboratories, takes his turn on maternity duty under proper supervision in the maternity ward and district, thus obviating any necessity for seeking instruction elsewhere. Students are instructed in the administration of anæsthetics by the hospital anæsthetists.

The arrangements are made to meet the requirements of all the Examining Bodies. Special classes are held for the examinations at the University of London and for the First and Final Fellowship Examinations of the Royal College of Surgeons of England. Tutorial classes in all subjects precede the various examinations. The hospital is easily accessible from all parts.

Appointments.—A Resident Assistant Physician and a Resident Assistant Surgeon, salary £225 each per annum, and a Resident Anæsthetist, salary £200 per annum, are appointed annually. Two Hospital Registrars, Medical and Surgical, at an annual salary of £250 each are appointed yearly. The tenure of these offices may be renewed for a term not exceeding two years. A Pathological Registrar to the Department of Obstetrics and Gynæcology (at an annual salary of £250), an Ophthalmic Registrar (at an annual salary of £200), and an Orthopædic Registrar (unpaid) are appointed yearly. Two Senior Resident Casualty Officers (Medical and Surgical) are appointed yearly. Eight Resident Casualty Officers and Anæsthetists are appointed every six months. Seven House Physicians (including two Obstetric House Physicians, and one House Physician to the Department of Diseases of Children), nine House Surgeons (including two Ophthalmic House Surgeons, one Orthopædic House Surgeon, and two House Surgeons to the Ear, Nose and Throat Department) are appointed every six months. Clinical Assistants in the Special Departments are appointed every three months, and hold office for six months if recommended for re-election. There are three Assistants in the Department of Pathology; the Senior receives £600 a year, and the two Juniors £450 each.

Scholarships and Prizes.—At this school there are five Entrance Scholarships—namely, two in Arts, equivalent to the tuition fees for the first year of study; two in Natural Science, of the value of £150 and £60 respectively; and the University Scholarship of £100 in any two of the following: Anatomy, Physiology, Pathology, Chemistry. The value of all entrance scholarships must be taken out in tuition fees. The money value and subjects of examination of the remainder are as follows: (*a*) William Tite Scholarship for second-year students, £25; (*b*) and (*c*) Musgrove Scholarship or (alternately) Peacock Scholarship, each for third-year students and tenable for two years, £35 each; (*d*) Mead Medal, Medicine, Pathology and Hygiene; (*e*) Wainwright Prize, Medicine; (*f*) Toller Prize, Medicine; (*g*) Cheselden Medal, Surgery and Anatomy; (*h*) Clutton Memorial Medal in Clinical Surgery, biennial; (*i*) Beaney Scholarship, £50, biennially, Surgery and Surgical Pathology; (*j*) Solly Medal and Prize, biennial, Reports of Cases; (*k*) Sutton Sams Prize, biennial, Report of Cases; (*l*) Bristowe Medal, Pathology and Morbid Anatomy; (*m*) Hadden Prize, Pathology and Morbid Anatomy; (*n*) Grainger Testimonial Prize, £31 10*s.*, Anatomy and Physiology; (*o*) Louis Jenner Research Scholarship, tenable for two years, £60 annually, Pathology; (*p*) School Council Research Scholarship, £250 per annum, tenable for two years; (*q*) John and Temple Research Fellowship, tenable for two years, £450, Children.

St. Thomas's House, the New Students' Club recently opened, comprises spacious dining-, smoking-, and reading-rooms, and accommodation for some 60 resident students. There is no occasion for students to leave the hospital premises during working hours.

Further information may be obtained from the Medical Secretary of the School, St. Thomas's Hospital.

UNIVERSITY COLLEGE HOSPITAL MEDICAL SCHOOL.—The final subjects in the curriculum are taught at the Medical School of the hospital, which has 526 beds, including 74 in the new obstetric hospital. The course of instruction is suitable for the examinations at the

Universities of Oxford, Cambridge, Durham, and other British Universities, and for the medical education required by the Examining Board in England and the Society of Apothecaries. Clinical Units in Medicine, Surgery, and Obstetrics and Gynæcology are now in operation. The whole-time Directors of the Units are concerned with the organisation of the teaching generally, but the honorary staff are responsible for the largest share of the teaching in the wards and Out-patient Department of the hospital. The department of otology, rhinology, and laryngology (the Royal Ear Hospital) has been provided with a separate building in Hunter-street, adjacent to the obstetric hospital. It contains 39 beds, including eight private wards for patients of limited means. The hospital is equipped with all modern appliances for investigation. The new buildings of the Obstetric Hospital of 74 beds (rendered possible by the Rockefeller Benefaction), the new Residents' House (with accommodation for 30 residents and students), the extension to the Nurses' Home, and new research laboratories for the Medical School are now finished and in full occupation. Twelve women students are admitted annually.

Those who are desirous of carrying out original research in Pathology, including Morbid Anatomy, Bacteriology, Experimental Pathology, and Chemical Pathology, are admitted to work in the laboratories of the school by the Professor of Pathology, and under certain conditions can receive grants from the Charles Graham Medical Research Fund. A special course of instruction is given in conjunction with University College for preparation for the examinations for Diplomas in Public Health of the various universities and examining bodies. In the Dental School in Great Portland-street, formerly known as the National Dental Hospital, there is afforded the opportunity for attending lectures and practical instruction in diseases of the mouth and teeth.

Appointments.—Clerkships and dresserships to the physicians, surgeons, anæsthetist, and pathologist are allotted amongst the students of the hospital. Maternity students are appointed each month and reside in the Students' House connected with the Medical School and Hospital. Sixteen house physicians, ten house surgeons, ten obstetric assistants, four house surgeons to the Royal Ear Hospital (of the total number of resident officers not more than three may be held by women students at any one time) are selected annually by examination from among the senior students who have a medical qualification. All house officers reside free in the hospital. In addition to these posts there are certain special appointments which are vacant from time to time and are filled by senior students of the hospital: Resident Medical Officer, Surgical Registrar, Medical Registrar, Obstetric Registrar, Harker-Smith Cancer Registrar, Ophthalmic Registrar, Registrar to the Royal Ear Hospital, Casualty Medical Officer and a Casualty Surgical Officer, Assistants in Ear and Throat, Skin and Venereal Diseases Departments, and House Anæsthetist.

Assistants to the Medical, Surgical, and Obstetric Units.—These salaried appointments, that have come into existence recently at the same time as the creation of the whole-time Chairs in Medicine, Surgery, and Obstetrics, are of great value to senior students who may desire to remain at Hospital after holding the ordinary resident appointments. They enable a man to continue clinical work and also to devote time to laboratory or other research, so as to fit himself for higher posts in the profession. The salaries range from £250 up to £800 a year, resident quarters being provided only for the chief assistant to the Obstetric Unit. The total number of such Assistantships varies from time to time, being generally about 12, and an aggregate sum of about £5000 annually is available for their salaries.

Scholarships and Prizes (those in connexion with University College have already been enumerated).—At this School the first two Scholarships (*a*) and (*b*) entitle the holder to a complete course at University College and University College Hospital Medical School; the second two (*c*) and (*d*) entitle to a final course at the Medical School. The money value and subjects of examination are as follows:—(*a*) Entrance Scholarship, Bucknill, 135 guineas, Chemistry, Physics, Botany, and Zoology; (*b*) Epsom Free Medical Scholarship, subjects of Preliminary Scientific Examination and Nomination by Epsom College; (*c*) and (*d*) two Goldsmid Entrance Exhibitions 112 guineas each, Anatomy or Physiology, or General Pathology; (*e*) Graham Scholarship in Pathology, £300 per annum for two years, awarded by the Senate of the University of London; (*f*) Atkinson Morley Scholarship, tenable for three years, £45 per annum, Surgery; (*g*) Atchison Scholarship, tenable for two years, £55 per annum, General Proficiency in Medical Studies; (*h*) Magrath Clinical Scholarship, about £150, Clinical Cases; (*i*) Percival Alleyn Scholarship, about £75, Surgery; (*j*) Filliter Exhibition, £30, Pathology; (*k*) Erichsen Prize, £10 10*s*., Practical Surgery; (*l*) two Senior and two Junior Fellowes Clinical Medals for Clinical Medicine; (*m*) two Liston Gold Medals for Clinical Surgery; (*n*) Alexander Bruce Gold Medal for Pathology and Surgery; and (*o*) Tuke Silver and Bronze Medals for Pathology. (*p*) Radcliffe Crocker Travelling Scholarship for Dermatology. (*q*) Leslie Pearce Gould Travelling Scholarship for Surgery.

The *Museum of Pathological Anatomy* is open for study daily, and microscopic sections of most of the specimens have been prepared and are available for the use of students on application to the Curator. The Anatomical Museum of the University of London, University College, is open to all students of University College Hospital and Medical School on the recommendation of the School Committee. The Medical Library, open daily to every student of the School, contains about 20,000 works on medical subjects, including all the current text-books and works of reference required for study or research.

The Medical Society of University College Hospital Medical School exists for the dual purpose (1) of promoting the study of medical and surgical science, and (2) of promoting social intercourse among its members. All male students of the Medical School are required to become members. Meetings are held once a fortnight for the purpose of discussing subjects connected with the study of medicine. In its social aspect the society includes various athletic clubs and superintends the gymnasium and squash racquet court in the Medical School, and the Athletic Ground at Perivale.

University College Hall, Ealing, is recognised by the authorities as a residential hostel. The Students' House in University-street contains large and comfortable rooms. The Maternity Students occupy them on payment of a moderate charge.

Full information can be obtained from the Dean of the School.

WESTMINSTER HOSPITAL.—The Hospital contains 248 beds, and has attached to it a Radium Clinic with 23 beds. There are separate departments for diseases of the eye, skin, teeth, ear, nose and throat, for orthopædic practice, for diseases of women, for diseases of children, for radiography, for venereal disease, and for massage, electrical and light treatment. The anatomical, pathological, and materia medica museums are open to all students of the School.

The entire teaching of the Hospital is devoted to the subjects of the Final Examinations. Arrangements are made for the tuition required for Preliminary and Intermediate subjects.

Appointments: Paid appointments as Medical, Surgical, and Obstetric Registrars, Casualty Officers, House Physicians, House Surgeons, Anæsthetist, &c., are available for students when they have passed their examinations.

Research: There are excellent opportunities for Research work in the recently endowed John Burford Carlill Laboratories. Grants to assist Research

workers are made annually from the John Burford Carlill Endowment.

Fees: Annual fee, £40. An entrance fee of 10 guineas includes membership of the Sports Union Club with its various branches—i.e., football, cricket, tennis, boxing, and Guthrie Society. The Athletic Grounds are situated in Tooting and are reached in 20 minutes from the hospital.

Scholarships and Prizes.—The following Entrance Scholarships are offered for competition: Winter Session: Two Scholarships in Anatomy and Physiology, £75 each. Summer Session: Two Scholarships in Anatomy and Physiology, £75 each. A certain number of Scholarships have been allotted to Universities of England, Wales, and the Colonies, and to Public Schools. These Scholarships are awarded entirely on the nomination of the principal of the university or school. During the period of study the following prizes may be competed for: Sturges Prize in Clinical Medicine, about £6, Reports on Cases; Chadwick Clinical Surgery Prize, £5, Reports on Cases; Chadwick Prize, £21 in books or instruments—Medicine and Surgery, including Pathology and Applied Anatomy and Physiology; Frederic Bird Medal and Prize, open to Fourth-year Students, £14 in medal and books or instruments—Midwifery, Diseases of Women, Medicine, Pathology, Forensic Medicine and Bacteriology, and Public Health and Toxicology; Abrahams Prize in Clinical Pathology, 5 guineas, a Paper and Tests in Practical Work; Alfred Hughes Memorial Prize, open to Second-year Students, about £5 in books or instruments—Anatomy; Huxley Memorial Prize, 3 guineas in books or cash, open to Second-year Students—Physiology; Carter Gold Medal and Prize for Botany, open to Students of not more than three years' attendance, gold medal and books of the joint value of £15; Jelf Medal awarded to Third-year Students; Second-year Scholarship £20, Elementary Anatomy, Physiology, Histology, and Organic Chemistry; Daniell Scholarship, £40, Chemistry; Rabbeth Scholarships open to First-year Students, one of £30 and one of £15; Class Examinations in the Preliminary Scientific Course.

Inquiries should be addressed to the Dean of the Medical School.

ROYAL FREE HOSPITAL, LONDON: SCHOOL OF MEDICINE FOR WOMEN.—The Royal Free Hospital contains 268 beds. The Hospital also has large Casualty and Out-patient Departments. A Children's Department, including 18 cots, an Orthopædic Department, and a Light Department have recently been added to the Hospital. Maternity Districts are attached to the Unit operating in the Gray's Inn-road and Essex-road areas. Students also attend the in-patient and out-patient practice of the Elizabeth Garrett Anderson Hospital, Cancer Hospital, Hospital for Sick Children, Great Ormond-street, National Hospital, Queen Square, South London Hospital, and Royal London Ophthalmic Hospital.

A Clinical Unit in Obstetrics has been established controlling 68 beds. Courses are arranged for the Primary Fellowship Examination of the College of Surgeons. The Eastman Dental Clinic, for which Mr. George Eastman, of Rochester, N.Y., has provided the building fund, is in course of erection and will provide a Dental School for women; at present the course for dental students is in conjunction with the Royal London Dental Hospital, Leicester-square.

The School buildings have been entirely rebuilt in recent years, and there are spacious, well-equipped laboratories, which afford every facility for efficiency of teaching and practical work in all departments.

There are residential chambers in the neighbourhood and the Warden can be consulted on the subject.

Students after qualification can hold the posts of house physicians, house surgeons, obstetric assistants, clinical assistants, assistant anæsthetist, medical, gynæcological, and surgical registrars, and assistant pathologist; and at the Medical School the posts of demonstrators in the departments of Anatomy, Physiology, Pharmacology, Biology, Chemistry, and Physics.

Scholarships and Prizes. Among the larger of these awards are the following:—(*a*) Isabel Thorne Scholarship, £30. (*b*) St. Dunstan's Medical Exhibition, £60 a year, tenable for three or five years. (*c*) Mrs. George M. Smith Scholarship, £50 a year, tenable for three or five years. (*d*) Bostock Scholarship, tenable for two or four years, £90. (*e*) Mabel Sharman-Crawford Scholarship, tenable for four years, £20 a year. (*f*) Sir Owen Roberts Scholarship, £75 a year for four years. (*g*) Mabel Webb Research Scholarship, tenable for one year and renewable, £30, Physiology, Chemistry, or Pathology. (*h*) Fanny Butler Scholarship, tenable for four years; next award in July, 1931, £16. (*i*) John Byron Bursary, tenable for two years, for students already in the School requiring assistance for the prosecution of their medical studies; application to the Secretary by March 31st next, £20. (*k*) Helen Prideaux Prize and Julia Ann H. Cock Prize, to be spent in assisting the newly qualified holder to further study, £60 each. (*l*) Dr. Edith Pechey Phipson Post-graduate Scholarship of the value of £100, open to all medical women, preferably coming from India, or going to work in India. (*m*) Sarah Holborn Scholarship, value £20 a year for three or five years, awarded every alternate year; next award in 1931. (*n*) Dr. Margaret Todd Scholarship, tenable for four years, £37 10*s.* a year, awarded in alternate years; next award in July, 1931. (*o*) Lieutenant Edmund Lewis and Lieutenant Alan Lewis Memorial Scholarship, tenable for four years, awarded every four years; next award in July, 1932. (*p*) Alfred Langton Scholarships, tenable two years, one awarded annually, £50 a year. (*q*) School Jubilee Bursary, tenable for three years, £50 a year. (*r*) Flora Murray Bursary, awarded every year to a fifth-year student, £50. The Dorothy Chick Gift, £20, is awarded annually for efficiency in Practical Midwifery.

The Students' Union arranges the social, athletic, and other clubs and societies. The School sports ground, consisting of 7½ acres of freehold land, is situated at Sudbury (easily reached from Euston Station).

Inquiries may be addressed to the Warden and Secretary of the Medical School, 8, Hunter-street, London, W.C.

UNIVERSITY OF DURHAM.

The University of Durham grants degrees of Bachelor of Medicine, Bachelor of Surgery, Doctor of Medicine, Master of Surgery, Doctor of Surgery, Bachelor of Hygiene, Doctor of Hygiene, Bachelor of Dental Surgery and Master of Dental Surgery, the Diploma in Public Health, Diploma in Psychiatry, and a Licence in Dental Surgery.

For the degrees of *Bachelor of Medicine* and *Bachelor of Surgery* there are four professional examinations. The subjects of the First Examination are—Elementary Biology and Organic Chemistry. The subjects of the Second Examination are—Anatomy and Physiology. The subjects of the Third Examination are—Pathology and Bacteriology, Materia Medica, Pharmacology and Pharmacy, Medical Jurisprudence, and Public Health. The subjects of the Fourth Examination are—Medicine, Clinical Medicine, Therapeutics, Surgery, Clinical Surgery, Operative Surgery, Midwifery and Gynæcology, Psychological Medicine, Diseases of the Skin, of the Throat, Nose, and Ear, and of Children, and Ophthalmology. It is required that at least one of the five years of professional education shall be spent at the University of Durham College of Medicine, Newcastle-upon-Tyne.

For the degrees of *Doctor of Medicine* and *Master of Surgery* a candidate must not be less than 24 years of age. He must also have obtained the degrees of

Bachelor of Medicine and Surgery of the University of Durham, and must have been engaged for at least two years subsequently to the date of admission to these degrees in research work, or in attendance on the practice of a recognised hospital, or in the naval or military services, or in medical or surgical practice. The candidate for the M.D. degree may present an essay or undergo a special examination in the subjects of Medical Anatomy, Medical Pathology, and the Principles and Practice of Medicine. The subjects of examination for the M.S. are:—Principles and Practice of Surgery, Surgical Pathology, Surgical Anatomy, Surgical Operations, Clinical Surgery.

Doctor of Medicine (without residence).—The University of Durham has instituted a special examination whereby the degree of Doctor of Medicine may be obtained without residence. Candidates must not be under 40 years of age and must have been in active practice for 15 years as registered medical practitioners. They must also produce certificates of moral character from three registered members of the medical profession. The fee is 50 guineas (including the degree fee), of which 20 guineas is retained if the candidate fails to satisfy the examiners.

Doctor of Surgery.—The University of Durham grants the Degree of Doctor of Surgery. Candidates for this degree must be registered medical practitioners, and not less than 25 years of age. They must devote three years, subsequently to obtaining a registrable qualification, to the study of Surgery and ancillary subjects. One at least of the three years must be spent in the University. The candidate must submit to the Professor of Surgery the course of study he proposes to follow, and this course must be approved by the Board of the Faculty of Medicine. One year shall be devoted mainly to work in the departments of Anatomy, Physiology, Pathology, and Bacteriology, and the candidate must submit evidence of having so worked. Not less than six months of another year must be spent as resident surgeon in a recognised teaching hospital, and the rest of the year in the study of surgery in a recognised medical centre. Not less than six months of one of the three years must be spent in surgical study abroad.

Candidates for any of the above degrees, diplomas, or licence must give at least 28 days' notice to the Secretary of Examinations, University of Durham College of Medicine, Newcastle-upon-Tyne. In the case of the M.D. (essay) examination candidates must send in their essays before April 1st.

Scholarships and Prizes.—The following are awarded:—University of Durham Entrance Scholarship, £25 a year for four years; Pears' Entrance Scholarship, £40 a year for three years (awarded every third year); Heath Entrance Scholarship (from Kepier Grammar School), £60 (renewable); Province of Durham Masonic (Entrance) Scholarship, £60 (renewable); Heath Scholarship for Surgery, £200, available every second year; Rutherford Morison Surgical Scholarship, £180, available every third year.

The following Scholarships are tenable for one year, namely:—Tulloch Scholarship for Elementary Biology and Organic Chemistry, £20; Dickinson Scholarship for Medicine, Surgery, Midwifery, and Pathology; Gold Medal and £20; Charlton Scholarship for Medicine, £25; Gibb Scholarship for Pathology, £28; Luke Armstrong Scholarship for Comparative Pathology, £25; Stephen Scott Scholarship for Surgery, £40; Philipson Scholarships for highest marks in Final M.B., B.S. Examinations, two of £48 each; Goyder Memorial Scholarship for Clinical Medicine and Clinical Surgery, interest on £325; Gibson Prize for Midwifery and Diseases of Women and Children, £10; Turnbull Prize and Silver Medal for Surface Anatomy; and Outterson Wood Prize for Psychological Medicine, £10; Sewell Memorial Prize and Silver Medal for Clinical Pathology.

For further information apply to the Dean of the College.

COLLEGE OF MEDICINE, Newcastle-upon-Tyne.—Hospital practice is carried out at the Royal Victoria Infirmary, a general hospital containing more than 550 beds, and there are facilities for the study of the various special subjects.

Practical midwifery can be studied at the Princess Mary Maternity Hospital, which contains 90 beds, with an annual indoor and outdoor attendance on 3000 cases.

The bacteriological laboratory is adjacent to Armstrong College.

A *Students' Union* has been erected and furnished at a cost of over £54,000, and is now in daily use. Special accommodation has been provided for women students.

NEWCASTLE-UPON-TYNE ROYAL VICTORIA INFIRMARY.—The Infirmary has 572 beds. Clinical Lectures are delivered by the Physicians and Surgeons weekly and ward demonstrations are given daily. Tutorial classes are held by specially appointed Medical Tutors, Assistant Surgeons and Senior Assistant in the Gynæcological Department, and demonstrations are given in the several out-patient departments daily. Pathological demonstrations are given by the Pathologist daily or as opportunity occurs, and in the new buildings nothing has been spared in perfecting scientific equipment. In addition to medical and surgical in-patient and out-patient departments the following special departments are fully equipped for teaching students: Ophthalmic, Throat, Nose, and Ear, Skin, and Venereal Disease, Gynæcological, and Electrical. The hospital building contains the following laboratories: 1. Special Pathological Laboratory, attached to the post-mortem rooms. 2. Bacteriological Laboratory in which all clinical bacteriological investigations are carried out with a view to treatment by vaccines and serums. 3. There is in addition a Clinical Laboratory attached to each ward and to the out-patient department. There are five operating theatres in use in the hospital. The winter session of 1929 opens on Oct. 2nd and the summer session of 1930 on April 7th.

Applications for detailed information should be made to the Sub-Dean, Dr. Horsley Drummond, at the hospital.

Practical Midwifery is studied at the Princess Mary Maternity Hospital, a new building, excellently equipped, with 90 beds. Instruction is given in Psychological Medicine at the City of Newcastle Mental Hospital. A special course of instruction is given in the City Hospital for Infectious Diseases by the City Officer of Health.

Post-graduate Instruction.—1. General courses in Clinical Medicine, Surgery, and Pathology at the Royal Victoria Infirmary, meeting once weekly for ten weeks. One course will be held from October to December and one from April to June. 2. Special courses of clinical instruction, meeting once weekly for ten weeks, in the following subjects: Gynæcology; Diseases of the Eye; Diseases of the Throat, Nose, and Ear; Diseases of the Skin; Venereal Diseases; Neurology; Diseases of Children; Electrotherapeutics and Radiology; special courses in Midwifery will be held at the Princess Mary Maternity Hospital. 3. An intensive course of 14 days' duration in the early part of the Summer Vacation. 4. In addition to the regular post-graduate courses practitioners may attend the ordinary medical and surgical practice of the Royal Victoria Infirmary, and also at the Princess Mary Maternity Hospital, for specified periods.

UNIVERSITY OF BIRMINGHAM.

The University of Birmingham grants the degrees of M.B., Ch.B., M.D., Ch.M., and Ph.D. (for Research Study), and also a degree and a diploma in Public Health. The course for the Bachelors' degrees, including the subjects of Physics, Chemistry and Biology, extends over six years. The Senate has power of recognising attendance at another University as part of the attendance qualifying for these

degrees and of recognising examinations passed at such other Universities as exempting from the examinations in Physics, Chemistry, Biology, and Organic Chemistry; but at least three years must be spent in attendance upon classes in the University. The final year may be spent at any other medical school recognised by the University.

Degrees of Bachelor of Medicine and Bachelor of Surgery.—The student must have passed the Matriculation Examination of the Joint Board or an examination accepted in lieu thereof. Before commencing the study of Anatomy and Physiology examinations in Chemistry and Physics and Biology must be passed (First M.B., Ch.B., Parts I. and II.). All communications respecting the Matriculation Examination, and examinations accepted in lieu thereof, must be sent to the Secretary, Joint Matriculation Board, 315, Oxford-road, Manchester. Second Examination.—Part I., Biology and Organic Chemistry; Part II., Anatomy and Physiology. Third Examination.—General Pathology and Bacteriology. Fourth Examinations (at the end of the fifth year).—Forensic Medicine and Toxicology; Public Health; and Materia Medica, Pharmacology and Therapeutics. Two years' hospital work must have been accomplished. Final Examination.—Medicine, Surgery, Midwifery and Diseases of Women, Mental Diseases, and Ophthalmology. Attendance at a general hospital for a year after the passing of the fourth examination will be required, also attendance at a fever hospital three months, maternity hospital three months, and mental hospital three months. Vaccination instruction must be taken and courses of Ophthalmology, Venereal and Skin Diseases, and Diseases of Ear, Nose, and Throat, Medical and Surgical Anatomy, and Operative Surgery. Distinctions may be awarded in the subjects (severally) of the Second, Third, Fourth, and Final, and First and Second-class Honours in the Final Examination.

Degrees of Doctor of Medicine and Master of Surgery. At the end of one year from the date of having passed the final M.B., Ch.B. examination the candidate will be eligible to present himself for the higher degrees of either Doctor of Medicine or Master of Surgery or both. Candidates have to present a thesis on some subject embraced in the medical curriculum, and pass a general examination in Principles and Practice of Medicine for the M.D., and one in Principles and Practice of Surgery, including operations on the cadaver, for the Ch.M., or, at the discretion of the examiners, in a special branch of Medicine or Surgery respectively. A thesis of exceptional merit may exempt from any part of these examinations, in which Honours may be awarded.

Degree of Ph.D.—The Degree of Doctor of Philosophy is conferred upon candidates who possess a medical degree of a British, Colonial, or other university approved of by the Senate of the University, and who have been engaged, to the satisfaction of the Medical Faculty, in advanced study and research for a period of not less than two years, either in a laboratory of the University or in one or more of the hospitals associated with the University. After the first year candidates may carry on research elsewhere, under approved conditions, and on completing the course present a thesis and submit themselves for oral and possibly written examination.

Scholarships and Prizes.—The following are awarded:—Entrance Scholarships: (*a*) Frank Fletcher and Catherine Fletcher Scholarships of £100 per annum each, for five years. Two or more offered annually; open to men and women students under certain prescribed conditions as to residence, &c.; (*b*) Sydenham Scholarship of £42, tenable for three years, award of Council to orphan sons of medical practitioners; (*c*) Sands Cox Scholarship of £21 per annum during two years, awarded to the candidate, not being more than 19 years of age, taking the highest marks at the Higher School Certificate Examination of the Joint Matriculation Board; (*d*) Dental Scholarship of £46 17*s.* 6*d.*, Open Competitive Examination in subjects learned during apprenticeship; (*e*) Myers Travelling Studentship of £300, tenable for one year, offered in alternate years, awarded by vote of committee to M.B., Ch.B. candidates, tenable at some University or Hospital not in Great Britain or Ireland (available for year 1929–30); (*f*) two Ingleby Scholarships of £10 each, awarded to the candidate at Final Examination obtaining highest "first-class" marks in the subjects of Midwifery and Diseases of Women; (*g*), (*h*), (*i*), and (*j*) Four Queen's Scholarships of £10 10*s.* each. In the Second, Third, and Fourth Examinations the Scholarship is awarded respectively to the student taking the first place and whose work is sufficiently distinguished. In the Final Examination the Scholarship is awarded to the candidate taking the first place in the examination and whose work is regarded as sufficiently distinguished. (*k*) George Henry Marshall Scholarship of £10, awarded annually, for the encouragement of Research Work in Ophthalmology; and (*l*) Russell Memorial Prize, a prize of books, value about £2, awarded annually to the student who, not being of more than six years' standing as a student of the School of Medicine of the University, shall pass the best examination in the subject of Nervous Diseases. The "Arthur Foxwell Memorial Medal" (Gold Medal for Medicine) is awarded annually to the candidate taking the highest place in Clinical Medicine and passing the Final M.B., Ch.B. Examination in June; and the "Sampson Gamgee Memorial Medal" (Gold Medal for Surgery) is awarded annually to the best candidates passing Final M.B., Ch.B. Examination in June in Surgery provided that not less than 60 per cent. of marks is obtained (paper, oral, and clinical). The University Clinical Board awards Gold and Silver Medals on examinations in Medicine, Surgery, and Midwifery, respectively, in fourth and fifth years, open to all students.

Clinical Instruction.—The medical students of the University receive their clinical instruction by attending the amalgamated practice of the General Hospital, Queen's Hospital, Maternity Hospital, Children's Hospital, Mental Hospital, and Fevers Hospital, under the direction of the University Clinical Board. Appointments are open to students varying from £40 to £200 a year.

Post-graduate Instruction.—A "William Withering Lectureship" has been established. A course (or courses) of lectures is given annually for post-graduates on subjects chosen from year to year. In 1930 the Lectures will be given by Dr. W. E. Dixon. The Ingleby Lectures on some subject in connexion with Diseases of Women and Children are given annually by specially appointed lecturers: The Lecturer for year 1930 is Sir John Bland-Sutton, Bart., LL.D., M.D., F.R.C.S. Post-graduate Courses of Clinical Demonstrations for General Practitioners are arranged annually (April to July) at the Birmingham General, Queen's, and Children's Hospitals.

QUEEN'S HOSPITAL.—330 beds. There is a close association of this Hospital with the University of Birmingham, and the University clinical teaching is conducted here, there being a wealth of excellent material. Ward rounds and out-patient clinic classes are held daily, and there are regular tutorial classes throughout the session. Post-graduate courses arranged by the University are conducted every year. There are special departments in Gynæcology, Diseases of the Eye, of the Ear, Nose and Throat, Dentistry, Radiography, Pathology, Bacteriology, Biochemistry, Physiotherapy, and Electrocardiography. There are also large Wards for Midwifery and Postnatal cases, a Nursery for instruction in Infant Welfare, an extensive Midwifery District, and residential facilities for students. There are 23 Resident Appointments (exclusive of Registrars) available each year for recently qualified students.

BIRMINGHAM GENERAL HOSPITAL.—406 beds. Special wards for Children, Gynæcological, Ear and Throat, Venereal, Maternity, and Septic cases; special beds for Eye and Skin cases. Laboratories for Bacteriology, Biochemistry, Cancer Research,

and Morbid Histology. Separate rooms adjoin the medical and surgical wards for clinical pathology. Five operating theatres (one for out-patients), all designed and fitted on modern lines. In addition to clinical teaching given in the wards and out-patient department by the honorary staff, medical and surgical tutorial classes are held for senior and junior students. Clinical instruction in all the special departments, which include those for Radium, Electrotherapy, Electrocardiographic investigation, and Venereal Diseases. Post-graduate classes in every branch of medicine and surgery. The Jaffray Branch Hospital contains 61 beds.

BIRMINGHAM AND MIDLAND EYE HOSPITAL, Church-street, Birmingham.—115 beds. Students attending for a period of three months will be granted certificates which will qualify for the University and Conjoint Board examinations. Post-graduate courses are available. A limited number of Non-Resident Clinical Assistants' posts are open to qualified practitioners, particulars of which can be had on application to the General Superintendent. This Hospital has a very large Out-patient Department.

UNIVERSITY OF LIVERPOOL.

The degrees in the Faculty of Medicine are Bachelor of Medicine and Bachelor of Surgery (M.B. and Ch.B.), Doctor of Medicine (M.D.), Doctor in Philosophy (Ph.D.), Master of Surgery (Ch.M.), Master of Hygiene (M.H.), and Master of Orthopædic Surgery (M.Ch.Orth.).

Matriculation.—Important alterations in regard to Matriculation requirements and to the First Year's course of study will come into operation in October, 1929. Particulars may be obtained on application to the Dean.

Degrees of Bachelor of Medicine and Bachelor of Surgery.—Candidates for the degrees of Bachelor of Medicine and of Surgery must have attained the age of 22 years on the day of graduation. At least two of the five years of medical study must have been passed in the University, and one year at least must have been passed in the University subsequently to the date of passing the First Examination. The other three years may be passed at any college or medical school recognised for this purpose by the University. Candidates must pass three examinations entitled respectively: the First Examination, the Second Examination, and the Final Examination. The subjects of the First Examination are: (1) Chemistry; (2) Biology (Zoology and Botany); (3) Physics; (4) Special Chemistry. The subjects of the Second Examination are (*a*) (1) Anatomy; (2) Physiology (including Physiological Chemistry and Histology); and (*b*) (3) Elementary Bacteriology, (4) Clinical Chemistry, (5) General Pathology. Candidates may present themselves in (*a*) or (*b*) separately. The subjects for the Final Examination are: (*a*) (1) Special Pathology and Morbid Anatomy; (2) Forensic Medicine and Toxicology; (3) Public Health; (4) Pharmacology and General Therapeutics; (*b*) (5) Obstetrics and Diseases of Women; (6) Surgery, Systematic, Clinical, Operative and Practical, including Ophthalmology; (7) Medicine, Systematic and Clinical, including Therapeutics, Mental Diseases, and Diseases of Children. Candidates may present themselves in Parts (*a*) and (*b*) separately, but candidates must have completed the fifth year of medical study before taking Part (*b*).

Degrees of Doctor of Medicine and Master of Surgery. **No candidate will be admitted to the degree of Doctor of Medicine or Master of Surgery unless he has previously received the Degrees of Bachelor of Medicine and Bachelor of Surgery, and at least two years have elapsed since he passed the examinations for those degrees.** Candidates for the degree of Doctor of Medicine are required (*a*) to present a thesis, acceptable to the Faculty, and certified to be the candidate's own work, together with (if the candidate desires) copies of published original papers upon Medical Science; (*b*) to present themselves for an oral examination on the subject of the thesis.

The University also awards a *Diploma in Medical Radiology and Electrology*—Part I., Physics: Part II., Radiology and Electrology. The parts may be taken at one examination or separately.

Scholarships, Fellowships, and Prizes.—The following are awarded: (*a*) Robert Gee Entrance Scholarship (Men), annually, of £42 10*s*., tenable for four years; (*b*) Lyon Jones Scholarship, No. 1, of £21 per annum, tenable for two years, Competitive Examination among Junior Students in First M.B. Subjects; (*c*) Lyon Jones Scholarship, No. 2, of £21, Competitive Examination on results of Professional Examination in Anatomy, Physiology, Elementary Bacteriology, Clinical Chemistry, and General Pathology; (*d*) Derby Exhibition of £15, Competitive Examination in Clinical Surgery, and (*e*) Clinical School Exhibition of £15 in Clinical Medicine; (*f*) University Scholarship of £50 for one year, awarded on results of the Final (Part A) Examination for the degrees; (*g*) Holt Fellowships, Physiology and Pathology, of £150 each, for one year; (*h*) Gee Fellowship, Anatomy, of £100, for one year; (*i*) John Rankin Fellowships in Anatomy, two, each of the value of £120, tenable for two years; (*j*) Johnston Colonial Fellowship, Biochemistry, of £100, for one year; (*k*) John W. Garrett International Fellowship, Bacteriology, of £100, for one year; (*l*) Thelwall Thomas Fellowship, Surgical Pathology, of £150, for one year; (*m*) Ethel Boyce Fellowship in Gynæcological Pathology, of £100 for one year; (*n*) Mary Birrell Davies Memorial Fund Scholarship, of the value of £60, tenable for four years, offered for competition in alternate years; open only to women students who will have attained the age of 19 on the first day of October next following the award; (*o*) Rankin Exhibition in Practical Anatomy, of £25, for one year; (*p*) Lady Jones Research Fellowship in Orthopædic Surgery, £200; (*q*) Samuels Memorial Scholarships, three at £20; (*r*) Ridgway Research Scholarship (£100); numerous prizes and medals.

The Medical School.—All the laboratories and class-rooms are situated close together, communicating with one another, and are made up of four large blocks of buildings which form one side of the College quadrangle. There are the Johnston Laboratories for Experimental Medicine and Biochemistry; the Medical School for Anatomy, Surgery, Toxicology, and Ophthalmology; and the Thompson-Yates Laboratories for Physiology and Pathology. There is also a separate building for Tropical Medicine. Medical research has also been endowed with several new laboratories in which students can pursue research work after graduation.

Clinical Studies.—The Clinical School of the University consists of four general hospitals—the ROYAL INFIRMARY, the DAVID LEWIS NORTHERN HOSPITAL, the ROYAL SOUTHERN HOSPITAL, and the STANLEY HOSPITAL; and of five special hospitals—the Eye and Ear Infirmary, the Hospital for Women (with the Samaritan Hospital), Liverpool Maternity Hospital, the Royal Liverpool Children's Hospital, and St. Paul's Eye Hospital. These hospitals contain in all a total of about 1445 beds. The organisation of these hospitals to form one teaching institution provides the medical student and the medical practitioner with a field for clinical education and study which is unrivalled in extent in the United Kingdom. All the hospitals are within easy access of the University. There are a large number of appointments to house physicianships and surgeonships both at the general and special hospitals which are open to qualified students of the school.

Public Health Department.—This is located in a separate building, in which full courses of instruction are given to students for the Diplomas and Degrees of the University and of other Examining Boards.

Prospectuses and further information may be had on application to the Dean of the Faculty of Medicine, University of Liverpool.

VICTORIA UNIVERSITY OF MANCHESTER.

Four degrees in Medicine and Surgery are conferred by the University—viz., Bachelor of Medicine and Bachelor of Surgery (M.B. and Ch.B.), Doctor of Medicine (M.D.), and Master of Surgery (Ch.M.). A Diploma in Psychological Medicine, a Diploma in Public Health, and a Diploma in Bacteriology are awarded by examination to registered medical practitioners.

Degrees of Bachelor of Medicine and Bachelor of Surgery.—Before admission to the degree of M.B. or Ch.B. candidates are required to present certificates that they will have attained the age of 21 years on the day of graduation, and that they have pursued the courses of study required by the University Regulations during a period of not less than five and a half years subsequently to the date of their registration by the General Medical Council, two of such years having been passed in the University subsequently to the date of passing the first M.B. Examination.

The First Examination: (1) Chemistry and Physics; (2) (*a*) Botany, (*b*) Zoology. Candidates must have attended during at least six months' courses both of lectures and of laboratory work in each of the above-named subjects. The Examination is divided into two parts: Part 1, Inorganic and Elementary Organic Chemistry and Physics; Part 2, (*a*) Botany, (*b*) Zoology. The candidates sit for these parts separately. The Second Examination: (1) Anatomy and Histology; (2) Physiology, including Physiological Chemistry. Bothparts must be passed simultaneously. The Third Examination: (1) Pharmacology and Materia Medica; (2) Pathology and Bacteriology. The Final Examination: (1) Medicine, Systematic and Clinical (including Mental Diseases and Diseases of Children); (2) Surgery, Systematic, Clinical, and Practical; (3) Obstetrics and Gynæcology (including Clinical and Practical); (4) Forensic Medicine (including an Oral Examination); (5) Hygiene and Preventive Medicine. The Final Examination is divided into two parts: Part I., Forensic Medicine, Hygiene and Preventive Medicine; Part II., Medicine, Surgery, Obstetrics and Gynæcology (Systematic, Clinical, and Oral). Candidates must pass in all subjects of Part I. and of Part II. simultaneously. Candidates for the Second Part must have completed the sixth year of medical study.

Degree of Doctor of Medicine.—Candidates are not eligible for the degree of Doctor of Medicine unless they have previously obtained the degrees of Bachelor of Medicine and Bachelor of Surgery and at least one year has elapsed since they passed the examination for those degrees. Candidates may elect either (1) to present an original dissertation; or (2) to undergo an examination. The dissertation must embody the results of personal observation or original research, either in some department of medicine or of some science directly relative to medicine. The examination, which will be written and practical, is in the Principles and Practice of Medicine, in Pathology, and in some other subject to be selected by the candidate.

Degree of Master of Surgery.—Candidates are not eligible for the degree of Master of Surgery unless they have previously obtained the degrees of Bachelor of Medicine and Bachelor of Surgery and at least one year has elapsed since they passed the examination for those degrees. The degree is conferred in the following branches: Surgery (Branch I.), Gynæcology (Branch II.), Ophthalmology (Branch III.), Laryngology, Otology, and Rhinology (Branch IV.).

Degrees of B.Sc. and M.Sc.—The ordinary degree of B.Sc. in the Schools of Anatomy and Physiology may be obtained by students in Medicine who in their third year of study for the degree of M.B., Ch.B. complete the additional courses in these subjects prescribed for this degree. Candidates for the Honours degree of B.Sc. in Anatomy or Physiology, who are students in Medicine, are required to attend courses in advanced Anatomy and Physiology for four terms after passing the Second Examination for the degrees of M.B., Ch.B. Graduates in science may proceed to the degree of M.Sc. by presentation of an approved thesis.

Diplomas: 1. The following are available for candidates holding a registrable qualification in medicine, surgery, and midwifery; examinations are in two parts in each diploma and are written, oral and practical. Candidates may present themselves for Parts I. and II. separately or at the same time provided that no candidate be admitted to Part II. unless he has already passed in Part I. No candidate's name will be published until he has satisfied the examiners in both parts of the examination:—

(*a*) *Diploma in Psychological Medicine.*—Part-time course: extending over three University terms, two of which must be spent at the University. Six months' residence must be spent at a recognised Hospital for Mental Diseases.

(*b*) *Diploma in Public Health.*—The course extends over twelve calendar months at least: Part I. of the examination is held in June and October, and Part II. in March and October. Instruction for at least one of the parts must be taken out at the University. Holders of the Diploma in Public Health are eligible for examination for the Certificates in School Hygiene and Factory Hygiene after attending the prescribed periods of study and hospital practice.

2. *In Veterinary State Medicine.*—Length of course, three University terms. Candidates must be members of the Royal College of Veterinary Surgeons.

3. *In Bacteriology.*—For candidates who have graduated either in science or medicine, or obtained other approved qualification. Length of course, one academic year. A satisfactory thesis on an approved subject must be presented.

Scholarships, Fellowships, and Prizes.—The following are offered in connexion with medical study at the Victoria University:—Scholarships: Dreschfeld Entrance (triennial), £20; John Russell Medical Entrance, £45; Sam Gamble Entrance for Women; Graduate Entrance (fees up to 160 guineas); two Dauntesey Medical Junior, £50 each; Dauntesey Medical Senior, £50; Professor Tom Jones Exhibition in Anatomy, £25; Dickenson Trust Scholarships in Anatomy and Pathology; Platt Physiological, £90; Graduate Research Scholarship, £70; Dickenson Trust Travelling Scholarships in Medicine and Surgery; Ashby Memorial in Diseases of Children (triennial), £100; John Henry Agnew in Diseases of Children, £120. Fellowships: Leech Research, £70; Professor Tom Jones, Surgical, £105; Morrison Watson in Anatomy, £150; Delépine in Preventive Medicine (biennial), £300; Worswick (Causes and Treatment of Rheumatoid Arthritis), £300; Zimmern Travelling Fellowship for Men, £175; Honorary Research Fellowships. Prizes: Sidney Renshaw in Physiology, £15; Wild Prize in Pharmacology, £10; Turner Medical, £20; Dumville Surgical, £15; Knight Prize in Psychological Medicine, £50; Graduate Prizes, £5 each. There are many general entrance scholarships, in addition to those already mentioned, open for competition, the examinations for which are held in the month of May. Full particulars can be obtained from the Registrar.

The Medical School.—This school, largely extended in 1920, is provided with dissecting-rooms, X ray rooms, physiological laboratories, private laboratories, and work-rooms, besides lecture-rooms, museums, and general and departmental libraries. A special laboratory is equipped for experimental work on the central nervous system. In the pathological laboratories (now removed to special buildings close to the Royal Infirmary) ample provision is made for the teaching of pathology and bacteriology and for the prosecution of original research. The Helen Swindells Laboratory is specially equipped for cancer research and investigation in general pathology. Ample facilities for investigation are provided in Anatomy, Physiology, and Materia Medica; new Pharmacological Laboratories have been added this year. In the public health department, which is lodged in a separate institute in York Place, near the Royal Infirmary, suitable

laboratory accommodation is provided for the study of sanitary chemistry, physics, and practical bacteriology in the departments of chemistry and physics and in that of pathology.

Clinical Studies.—The clinical and practical departments of medical study are taught partly in the Medical School and partly in the Royal Infirmary and St. Mary's Hospitals for Women and Children, a fever hospital, mental hospitals, a convalescent home, and other special hospitals. Medical and Surgical Clinical Classes are conducted in the Infirmary, and separate instruction is afforded in the elements of Medical and Surgical Physical Diagnosis, in Obstetric Medicine, Ophthalmic Surgery, and Pathological Anatomy by the different members of the staff of the Medical School and Infirmary.

Post-graduate Studies.—Post-graduate Courses in the following subjects have been arranged for during 1929-30, in addition to those usually held at the various hospitals: 1. Whole-time intensive courses in (i.) Obstetrics, (ii.) Medicine and Surgery, (iii.) (*a*) Fractures, (*b*) Oto-Laryngology. 2. A Post-graduate Day. 3. Part-time courses in (i.) Diseases of the Eye, (ii.) Diseases of the Skin, (iii.) Bacteriology and Immunity. 4. Clinical Assistantships. Syllabuses and other information may be obtained on application to the Dean of the Medical School, Manchester University.

MANCHESTER ROYAL INFIRMARY.—The Manchester Royal Infirmary is built on the pavilion system, near the University, and has accommodation for 668 patients (including 54 beds at the Central Branch). The medical side consists of four units, each unit having a testing-room for the scientific investigation of morbid products and a class-room. The surgical beds are arranged in five units, each unit having its own operation theatre, with anæsthetising, recovery, sterilising, testing and apparatus rooms, and its own class-room attached. All of these units are occupied. In the educational block is a large lecture theatre and a museum. In the same building is housed the X ray department, which has nine separate X ray outfits for different purposes, and in which one large room is put aside specially for X ray demonstrations and teaching purposes. A large massage school is also connected with this department.

Associated with the Infirmary are: (1) the Convalescent Hospital at Cheadle, containing 132 beds; and (2) the Central Branch in the City, which has now accommodation for 54 patients. The Associated Hospitals thus contain 800 beds and are under the same management. Women students are admitted on the same terms as men.

Two Entrance Scholarships in Medicine of the value of £160 each are offered annually by the Council of the Manchester University and the Medical Board of the Manchester Royal Infirmary for proficiency in Arts and Science subjects respectively. Other scholarships and prizes are mentioned in the College syllabus. Numerous annual appointments and junior appointments may be held by those who have attended the practice of the Infirmary.

ROYAL MANCHESTER CHILDREN'S HOSPITAL, Pendlebury, Gartside-street, Manchester, and Lytham St. Anne's.—The hospital contains 190 beds and 30 in the Convalescent Home, Lytham St. Anne's. The medical staff visit the hospital daily at 10 A.M. Clinical instruction is given by the medical staff at the Hospital and Dispensary. There is a new Massage and Electrotherapeutic Department, also an Artificial Sunlight Department. Clinical Assistants are appointed for periods of six months. In throwing open these appointments to qualified medical men and women, the Board is actuated by the desire to aid those qualified medical men and women who wish to have opportunities for the further study of disease in children, or who wish to fit themselves for posts as Medical Officers to Children's Hospitals, to Child Welfare Centres, or for School Medical Officer appointments. There is an Orthopædic Department. Out-patients' day is on Tuesday at Gartside-street, and a ward at Pendlebury is devoted to cases needing operative treatment. Out-patients are seen daily at 9 A.M. at the Out-patient Department, Gartside-street, Manchester. Secretary: Mr. W. M. Humphry.

ANCOATS HOSPITAL, MANCHESTER (Founded 1828).—114 beds with a Convalescent Branch of 35 beds at Great Warford, Alderley Edge, Cheshire.

The hospital will be extended during the next two years by the addition of a new ward block, an operating theatre block, pathological department, physiotherapeutic department, and lecture theatre.

The medical division consists of three units served by consultative out-patient clinics. One unit includes a cardiological department; another devotes special attention to gastro-enterology; and the third to neurology. The surgical division comprises an orthopædic unit in which all the fractures and injuries of the hospital are treated; a unit devoted particularly to urology; a unit devoted to abdominal surgery; and an oto-laryngological unit. All units include out-patient clinics. A special clinic staffed by a team consisting of surgeons, pathologist, radiologist, and consultant in radium therapy has recently been created for the study and treatment of malignant disease. The demand on the surgical in-patient accommodation is great, 800 patients at the present time being on the waiting-list. Clinical teaching is given both to undergraduate and post-graduate students in all out-patient clinics, in the wards, and in the form of special lectures. The under-graduate teaching includes a University course in Orthopædic Surgery given in the Michaelmas term, and demonstrations on the examination of the ear, nose and throat. The hospital takes an important share in the University of Manchester Post-graduate scheme. A post-graduate "day," open to all practitioners without fee, is held on each Thursday in the University terms. During the session (1929-30) special intensive post-graduate courses will be given in the treatment of Fractures (Oct. 7th–11th), and in Oto-Laryngology (March 3rd–8th). Applications for entry to these courses should be made to the Dean of the Faculty of Medicine, University of Manchester.

There are six residents: a resident surgical officer, a resident medical officer, three house surgeons, and one house physician. These appointments are open both to men and women graduates, and are recognised by the University of London for the purposes of the M.D. and M.S. degrees. There are also four registrar appointments (part time); medical, orthopædic, surgical, and pathological. These are made annually, and are renewable up to a period of three years. General Superintendent and Secretary: Herbert J. Dafforne.

MANCHESTER NORTHERN HOSPITAL FOR WOMEN AND CHILDREN, Park-place, Cheetham Hill-road, Manchester.—The hospital contains 73 beds. Out-patients are seen daily from 8.30 to 12 noon.

UNIVERSITY OF LEEDS.

Four degrees in Medicine and Surgery are conferred—viz.: Bachelor of Medicine and Bachelor of Surgery (M.B. and Ch.B.), Doctor of Medicine (M.D.), Master of Surgery (Ch.M.), also Degrees and Diplomas in Dental Surgery and Diplomas in Public Health and in Psychological Medicine. The courses and Degrees in the Faculty are open to men and women alike.

Degrees of Bachelor of Medicine and Bachelor of Surgery.—Candidates for these degrees are required to present certificates showing that they will have attained the age of 21 years on the day of graduation, and have attended courses approved by the University extending over not less than five years, two of such years at least having been passed in the University, one of which must be subsequent to the date of passing the First Examination. Candidates must also satisfy the examiners in the several subjects of the following examinations, entitled respectively: the

Matriculation Examination, or such other examination as may have been recognised by the Joint Matriculation Board in its stead; the First Examination; the Second Examination; and the Final Examination. The First Examination consists of: Part I., Physics and Inorganic Chemistry; Part II., Zoology and Botany. Candidates will be allowed to pass the two parts separately. The Second Examination consists of: Part I., Organic Chemistry; Part II., Materia Medica and Practical Pharmacy; Part III., Anatomy, Physiology. Candidates will be allowed to pass any parts separately, but Part I. must be passed before Parts II. or III. The Final Examination consists of: Part I., Pharmacology, Pathology and Bacteriology; Part II., Medicine, Surgery, Obstetrics, Gynæcology, and Clinical Pathology; Part III., Forensic Medicine, Public Health, and Therapeutics. Part I. may be taken at the end of the second clinical year, and Parts II. and III. may be taken at the end of the third clinical year, but not before the completion of the fifth year of medical study. If taken separately Part II. may be passed before Part III.

Degree of Doctor of Medicine and Master of Surgery.—Candidates are not eligible for the degree of Doctor of Medicine or Master of Surgery unless they have previously received the degrees of Bachelor of Medicine and Bachelor of Surgery of the University (or of Victoria prior to December, 1904) and at least two years' Hospital Practice or four years' other professional practice for the former, and one year has elapsed for the latter since they passed the examination for those degrees. Candidates for the degree of Doctor of Medicine may present a dissertation and, if the dissertation is considered to be of exceptional merit, will not be required to pass an examination. The first term commences on Oct. 1st. Prospectus can be obtained from the Academic Sub-Dean.

Post-graduate work.—Practitioners wishing to attend Infirmary practice during short periods, or post-graduate classes held by members of the clinical staff, may do so on application to the Clinical Sub-Dean, from whom particulars may be obtained.

Clinical Studies.—The clinical studies are pursued mainly at the LEEDS GENERAL INFIRMARY, which has accommodation for 630 in-patients, including 88 beds at branch hospitals in the country. Clinical teaching takes place daily in the wards, and Clinical lectures are given in Medicine and Surgery by the Physicians and Surgeons. There are Medical, Surgical, Ophthalmic, Aural, Electrotherapeutic, and Radiographic Departments, in each of which special instruction is imparted to students. Gynæcological and Children's Departments, together with Laryngeal, Venereal, and Skin Clinics, are in operation, and there is a special ward for cases of nutritional disorders of children. Several valuable prizes are given at the end of each session. Numerous appointments at the Infirmary are annually open to students after qualification. Further particulars concerning these, and the scholarships and prizes open to competition, may be obtained from the Dean of the Faculty of Medicine.

In addition to work in the General Infirmary, clinical instruction in obstetrics is given in the Leeds Maternity Hospital and in mental and infectious diseases in the Wakefield (W.R.) Mental Hospital and Leeds City Fever Hospital respectively.

UNIVERSITY OF SHEFFIELD.

The Degrees in the Faculty of Medicine are Bachelor of Medicine and Bachelor of Surgery (M.B., Ch.B.), Doctor of Medicine (M.D.), and Master of Surgery (Ch.M.), Bachelor of Dental Surgery (B.D.S.), and Master of Dental Surgery (M.D.S.). There is also a Diploma of Licentiate in Dental Surgery. The courses and degrees in the Faculty of Medicine are open to men and women alike. Candidates must matriculate in the University or pass such other examination as may be recognised for this purpose by the University and sanctioned by the Joint Matriculation Board, and must pass also the further examination in Chemistry and Physics.

Degrees of Bachelor of Medicine and Bachelor of Surgery.—**A candidate must have attained the age of 22 years on the day of graduation and have pursued the courses of study required by the University regulations during a period of not less than five years subsequently to the date of his matriculation and the passing of the further examination in Chemistry and Physics, three of such years at least having been passed in the University, one at least being subsequent to the passing of the First Examination.** The subjects of the First Examination are Chemistry, Physics, and Biology. The Intermediate B.Sc. Examination in these subjects will, on payment of the required additional fee, be accepted instead of this examination. Candidates must, after matriculation and the passing of the further examination in Physics and Chemistry, and registration as medical students, have attended courses of instruction (lectures and laboratory work) in chemistry, physics, and biology for one year each. The Second Examination: The subjects are Anatomy and Physiology. Candidates must have completed the second year of professional study. The Third Examination: The subjects are Pathology, Pharmacology, Anatomy, and Physiology. Candidates must have completed the Lent Term of the fourth year of professional study. The Final Examination: The subjects of the examination are: Part I., Forensic Medicine and Public Health; Part II., Medicine (including Mental Diseases and Diseases of Children), Surgery, Obstetrics (including Gynæcology). Candidates for Part I. must have completed the Michaelmas Term of the fifth year of professional study; candidates for Part II. must have completed the fifth year of professional study.

Degree of Doctor of Medicine.—**Candidates for the degree of Doctor of Medicine must have passed the examination for the degrees of M.B., Ch.B. at least one year previously, must present a thesis embodying observations in some subject approved by the professor of medicine, and must pass an examination in the Principles and Practice of Medicine.**

Degree of Master of Surgery.—**Candidates must have taken the M.B., Ch.B. at least one year previously, and must since have held for not less than six months a surgical appointment in a public hospital.**

The subjects of examination are Systematic, Clinical, and Operative Surgery, Surgical Anatomy, Surgical Pathology and Bacteriology.

Scholarships and Prizes.—The following are awarded: Four Town Trustees scholarships, offered annually, each of the value of £50 per annum for three years. Medical: offered annually, covers cost of medical curriculum. Six Edgar Allen, offered annually, each of the value of £125 per annum for three years. Post-graduate: Frederick Clifford scholarship, value £50 per annum, tenable for two years. Mechanics' Institute scholarship, value £50 for one year, renewable for a second year. Town Trustees fellowship, value £75 for one year. Medals and Prizes: Kaye scholarship; Gold Medal in Clinical Medicine and Surgery; John Hall Gold Medal in Pathology; Holroyd Gold Medal in Anæsthetics; bronze medals. Particulars of all the above may be obtained from the Registrar.

The Medical School.—The Medical Department occupies the entire north wing of the University quadrangle. The various athletic and other students' societies are under the management of the Union Representative Council, elected annually. There are large and comfortable common rooms both for men and women students, and two Students' Unions, one for men and one for women. A refectory is open daily at the University where students may obtain meals and refreshments at moderate prices. The University journal *The Arrows*, edited by a committee of staff and students, is published each term. The University Halls, "Oakholme," Clarkehouse-road; "Tapton Cliffe," Fulwood-road, and "Endcliffe University Hall," Endcliffe Vale-road, are recognised by the Senate as halls of residence for women students; full particulars may be obtained from the tutor for women students.

Stephenson Hall is a hall of residence for men students; particulars may be obtained from the Warden.

Clinical Studies.—The University is within easy reach of the various hospitals with which it is connected for clinical purposes.

The SHEFFIELD ROYAL INFIRMARY (500 beds) provides all the opportunities of a large general hospital with special departments for Skin and Ear. The Sheffield Royal Hospital, 320 beds, has special out-patient departments for Diseases of the Throat, Ear, Skin, Orthopædics, and Mental Diseases. The two institutions are amalgamated for the purposes of clinical practice, medical, surgical, and special. There are special departments for the treatment of Diseases of the Eye, with wards assigned to them, at both hospitals, and excellent junior appointments. The Jessop Hospital for Diseases of Women, with 145 beds, has also a Maternity department, with about 900 in-patients per annum and about 250 out-patient cases attended. The Children's Hospital has 85 beds. Special courses on Fevers are held at the City Fever Hospitals (690 beds) and on Mental Diseases at the South Yorkshire Mental Hospital (1860 beds). Every facility is afforded in the various laboratories for the prosecution of advanced studies and research.

Post-graduate Courses.—Post-graduate courses of clinical instruction are held annually in the various hospitals connected with the School.

UNIVERSITY OF BRISTOL.

In the Faculty of Medicine there are the following degrees:—Bachelor of Medicine and Bachelor of Surgery (M B. and Ch.B.), Doctor of Medicine (M.D.), Master of Surgery (Ch.M.), Bachelor of Dental Surgery (B.D.S.), and Master of Dental Surgery (M.D.S). There are also the following diplomas: Diploma in Public Health (D.P.H.), Diploma in Dental Surgery (L.D.S.), and Diploma in Veterinary State Medicine.

All candidates for degrees in Medicine, Surgery, and Dentistry are required to pass, at Matriculation standard, an examination called the School Certificate Examination, or to pass such examination as may be regarded as equivalent by the Senate. All courses, degrees, and diplomas are open to men and women alike.

Degrees of Bachelor of Medicine and Bachelor of Surgery.—Candidates shall be not less than 21 years of age and shall have pursued the courses prescribed by University Regulations during not less than five years after passing the first examination in Chemistry and Physics, and entrance on the professional curriculum at the University, or an institution recognised as equivalent, of which three shall have been passed in the University, and two of these three subsequent to passing the second examination. All candidates for the degrees of M.B., Ch.B., are required to satisfy the examiners in the several subjects of three examinations. The First Examination: The subjects of examination are: Chemistry (Inorganic), Physics, and Biology, the courses pursued being those for the time being approved for the intermediate part of the B.Sc. curriculum. This part of the curriculum shall extend over one year. (Candidates who have passed the Higher School Certificate approved by the Board of Education in these subjects will not be required to sit for the first examination and will be regarded as having completed one year of study.) The Second Examination: The subjects of examination are: Organic Chemistry and Elementary Anatomy (Part I.) and Advanced Anatomy and Physiology (Part II.). The Final Examination: The subjects of examination are: Materia Medica and Pharmacy, Pharmacology and Therapeutics, General Pathology, Morbid Anatomy, and Bacteriology (Part I.); Special Pathology, Forensic Medicine, Toxicology, and Public Health, Obstetrics (including Diseases of Women), Surgery (Systematic, Clinical, Practical, and Operative), Medicine (Systematic, Clinical, and Practical, including Mental Diseases) (Part II.). The subjects included in Part II. may be taken in two groups—viz., Group I., Surgery and Obstetrics; Group II., Medicine, Public Health, Special Pathology, Forensic Medicine, and Toxicology. Candidates may pass Parts I. and II. together, or separately, and the two groups of Part II. may be taken together or separately. Forensic Medicine and Toxicology may be taken with Part I., or with Group II. of Part II.

Degree of Doctor of Medicine.—Candidates shall be Bachelors of the University of not less than two years' standing as such and may elect either (1) to pass an examination in General Medicine, or (2) to pass an examination in State Medicine, or (3) to present a Dissertation. The candidate who elects to pass the examination in State Medicine must hold a diploma in Public Health of some University or College, and the candidate who elects to present a Dissertation may be examined in the subject thereof.

Degree of Master of Surgery.—Candidates shall be Bachelors of not less than two years' standing as such, during which period they shall have attended the Surgical Practice of an institution approved for the purpose. They shall pass an examination in Surgical Anatomy, Pathology, and Bacteriology, and Operative, Clinical, and General Surgery, and present to the University a Dissertation on some subject of Surgery. The degree may be taken also in General Surgery, and a Special Subject—e.g., Oto-Rhino-Laryngology, Ophthalmology, and Gynæcology.

Clinical Studies.—The allied hospitals (BRISTOL ROYAL INFIRMARY and BRISTOL GENERAL HOSPITAL) have between them about 600 beds and extensive out-patient departments, special clinics for Diseases of Women and Children and those of the Eye, Throat and Ear, in addition to large and well-equipped departments for Dental work and large outdoor Maternity Departments.

At each of these institutions there are well-arranged pathological museums, post-mortem rooms, and laboratories for Morbid Anatomy. There are also laboratories for work in Clinical Pathology, Bacteriology, and Cytology, in which special instruction is given in these subjects. Departments are provided and well equipped for X ray work, both for diagnosis and treatment, the various forms of Electrical treatment, including High-frequency Currents, Electric Baths, Finsen Light treatment, and Massage.

The students of the school also attend the practice of the Royal Hospital for Sick Children and Women, containing 140 beds, and that of the Bristol Eye Hospital with 40 beds, and the Southmead Hospital with 556 beds, may be visited.

There are numerous salaried junior appointments for residents who are graduates.

Scholarships and Prizes.—The following are awarded: The Ashworth Hallett Scholarship, value £45, open to women only; two Martin Memorial Pathological Scholarships of £10 each; the Tibbits Memorial Prize, value 9 guineas, for proficiency in practical surgery; the Committee's Gold and Silver Medals for fifth-year students for general proficiency; the Augustin Prichard Prize, value about 6 guineas, for proficiency in anatomy; the Henry Clark Prize, value 11 guineas, for proficiency in gynæcology; the Crosby Leonard Prize, value 7 guineas, for proficiency in surgery; the Suple Surgical Prize, a gold medal and 7 guineas; the Suple Medical Prize, a gold medal and 7 guineas; the Henry Marshall Prize, value £12, for dressers; the H. M. Clarke Scholarship, value £15, for proficiency in surgery; the Sanders Scholarship, value £22 10*s.*, for general proficiency; the Barrett-Roué Scholarship for proficiency in diseases of the eye, ear, nose, and throat, value £14; Lady Haberfield Scholarship, value about 25 guineas.

Bristol City Senior Scholarships and those offered by the counties of Gloucestershire, Somerset, Wilts, and Devon, are tenable in the University. Some of the Fellowships awarded by the Colston Research Society for research in the University and the Beaverbrook Fellowship are allotted to the Faculty of Medicine.

Post-graduate Study.—Qualified medical practitioners may be appointed as clinical assistants for a period of one or more months. They may act as assistants, if times permit, in more than one department and in any of the hospitals during their period of study. They will be entitled to the use of the clinical laboratories and medical library, and have the right to attend in all departments, including operations, post-graduate and ordinary clinical demonstrations, and post-mortem examinations. Demonstration courses with weekly lectures are held during May, June, and July.

All inquiries and applications for admission should be addressed to the Director of Post-graduate Studies (Clinical Section), Pathological Department, University of Bristol, who can be seen on any day by appointment.

Further information as to scholarships, curricula, and fees can be obtained from the Dean of the Faculty of Medicine or the Registrar of the University.

UNIVERSITY OF WALES.

This University has, inter alia, the privilege of granting Degrees in Medicine, and Diplomas in Public Health and Tuberculous Diseases. Preliminary courses of study for the Degrees in Medicine may be pursued at any of the constituent Colleges of the University—viz., at Aberystwyth, Bangor, Cardiff, or Swansea. The Welsh National School of Medicine is situated in Cardiff and is an integral part of the University College of South Wales and Monmouthshire there.

Particulars can be obtained on application to the Registrar of the University of Wales, University Registrary, Cathays Park, Cardiff, or the Dean of the Faculty of Medicine, or to the Secretary, Welsh National School of Medicine, Newport-road, Cardiff. All classes are open to both men and women students.

ENGLISH MEDICAL CORPORATIONS GRANTING DIPLOMAS.

EXAMINING BOARD IN ENGLAND BY THE ROYAL COLLEGE OF PHYSICIANS OF LONDON AND THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.

Under this heading we give the regulations for the examinations enjoined by the Conjoint Examining Board of the Royal Colleges of Physicians of London and Surgeons of England, and of the Society of Apothecaries upon students desiring their respective diplomas of qualification. We do not give any list of schools recognised by these bodies as eligible to prepare students for their examinations beyond mentioning that all the schools which we have already described (under the heading of the Universities to which they are attached) are recognised as suitable places of instruction by the corporations granting medical diplomas. The courses of study at the principal colonial medical schools are also recognised as qualifying for the examinations of these corporations.

Students are required to pass a Preliminary Examination in General Education recognised by the Board, and a *Pre-Medical Examination* in Chemistry and Physics conducted by the Conjoint Examining Board before commencing the five years curriculum of professional study or some other examination recognised by the Board—namely, the examination in Chemistry and Physics for the degree in Medicine of any University recognised by the Board; a Pre-Medical Examination conducted by any of the Qualifying Bodies whose Degrees or Diplomas are registrable on the Medical Register; the Higher School Certificates of Oxford and Cambridge Universities, and the Oxford and Cambridge Schools Examination Board; the Higher Certificates of London, Bristol, Durham Universities, the Joint Matriculation Board of the Northern Universities, and the Central Welsh Board Higher Certificate. A candidate must enter for Chemistry and Physics together, and he will not be allowed to pass in one without obtaining at the same time at least half the number of marks required to pass in the other subject. He will be admitted to the examination on producing evidence of having passed the required Preliminary Examination in General Education. The examination is partly written, partly oral, and partly practical. A candidate rejected in one or both subjects of the examination will not be admitted to re-examination until after the lapse of a period of not less than three months. The fee for the examination is £3 3*s.*, for re-examination in Chemistry £2 2*s.*, and for re-examination in Physics £1 1*s.*

There are two Professional examinations called the *First* and *Final Examinations*. The courses of study for these examinations may be commenced before the Pre-Medical examination in Chemistry and Physics or some equivalent examination has been passed, provided that three terms of study are completed after the examination has been passed.

The subjects of the First Professional Examination are: Section I. (*a*) Anatomy, including Histology and Embryology. (*b*) Physiology, including Biochemistry. Section II. Pharmacology, Practical Pharmacy, and Materia Medica. A candidate must have attended at a recognised Medical School courses of instruction in Anatomy, including Embryology, during five terms, during which he must have dissected the whole body, courses of instruction in Physiology, including General Biology, Biochemistry and Biophysics during five terms, courses of instruction in Pharmacology, Practical Pharmacy, and Materia Medica. A candidate may present himself for the two Sections together or separately, but he must take parts (*a*) and (*b*) of Section I. together until he has passed in one or both parts, but a candidate will not be allowed to pass in one part unless he obtains at the same time at least half the number of marks required to pass in the other part.

Section II. of the examination may be passed at any time before the candidate enters for the Final Professional Examination. The fee for the First Professional Examination is £10 10*s.*, for re-examination after rejection in Section I. £6 6*s.*, for re-examination after rejection in either part of Section I. £3 3*s.*, for re-examination after rejection in Section II. £3 3*s.* A candidate who produces satisfactory evidence of having passed an examination in the subjects of Section I. or of either part of Section I. and of Section II. in the examination for the degree in Medicine conducted at a University recognised by the Board will be exempted from further examination in such subjects.

Final Professional Examination.—The subjects of the Final Professional Examination are: Section I. Pathology (including Morbid Anatomy, Morbid Histology, and Clinical Pathology), and Bacteriology. Section II. Part I. Medicine, including Medical Anatomy, Forensic Medicine and Public Health. Part II. Surgery, including Surgical Anatomy and the use of Surgical Appliances. Part III. Midwifery and Gynæcology. The examination is partly written, partly practical, partly clinical, and partly oral. A candidate may take Sections I. and II. and the three parts of Section II. of the Final Examination separately or may take the whole examination together. He will be required to produce the certificates required by the regulations before being admitted to the respective parts of the examination. A candidate who produces evidence of having passed an examination for a degree in medicine in the subjects of Pathology and Bacteriology at a University recognised by the Board is exempted from Section I. The fee for admission to Section I. is £4 4*s.*; for admission to Section II., Part I., £10 10*s.*; Part II.,

£10 10*s.*; Part III., £6 6*s.*; and the re-examination fees are respectively £3 3*s.*, £6 6*s.*, £6 6*s.*, and £4 4*s.*

Students of recognised universities in England, Scotland, and Ireland, who have passed examinations for a degree in Medicine at their universities in the subjects of the First Examination of the Examining Board, may enter for a part of the Final Examination at the expiration of three years from the date of passing in Anatomy and Physiology on production of the required certificates.

Members of certain recognised Indian, Colonial, and Foreign universities who have passed examinations for the Degree of Doctor or Bachelor of Medicine or Surgery in the subjects of the First Examination may present themselves for the Final Examination under special conditions. The Board also grants Diplomas in Public Health, in Psychological Medicine, in Ophthalmic Medicine and Surgery, in Tropical Medicine and Hygiene, and in Laryngology and Otology. Candidates must hold a Medical qualification registrable in the United Kingdom or be Graduates in Medicine of a recognised Indian, Colonial, or Foreign University. Particulars and conditions of admission to all examinations, fees, &c., may be obtained from the Secretary of the Examining Board, Examination Hall, Queen-square, London, W.C. 1.

ROYAL COLLEGE OF PHYSICIANS OF LONDON:
THE MEMBERSHIP AND FELLOWSHIP.

The College confers two separate diplomas—the *Fellowship*, a purely honorary distinction, and the *Membership*, obtained by examination.

Membership.—The age for admission to this diploma, it will be noticed, has been changed from 25 to 23 years. The alteration in the by-law of the College is designed to enable men who have just finished house appointments to sit for an examination for which their recent clinical experience has exactly fitted them. The candidate must either have obtained the licence of the College, or a degree of Doctor or Bachelor of Medicine at a University which is registrable by the General Medical Council and is recognised by the Censors Board. The examination is directed partly to pathology and partly to the practice of medicine. Credit is also given to candidates who show a knowledge of Latin, Greek, French, or German. Further information may be obtained from the Registrar at the College. The fee for admission as a Member of the College is 40 guineas, except when the candidate for membership is a licentiate of the College, in which case the fee already paid for the licence is deducted from the 40 guineas. The fee for the examination is 10 guineas, which is reckoned as part of the fee for admission in the case of success.

Fellowship.—The *Fellows* are selected annually from the ranks of the *Members* by the Comitia of the College.

ROYAL COLLEGE OF SURGEONS OF ENGLAND:
THE FELLOWSHIP.

The Royal College of Surgeons of England confers its diploma of Fellow upon a few distinguished persons in an honorary capacity. Two Members of long standing may also be elected to the Fellowship annually. But the bulk of the Fellows obtain the diploma as the result of examination.

Fellowship.—The examination for the Fellowship is divided into two parts—viz., the First Examination and the Second Examination. The subjects of the First Examination are Anatomy and Physiology, and those of the Second Examination are Surgery, including Surgical Anatomy and Pathology. The examinations are partly written and partly vivâ voce, and include the examination of patients and the performance of operations on the dead body. The First Examination is held in June and December and the Second Examination in May and November.

The fees for examination are: First Examination, first admission 8 guineas, and for each readmission 5 guineas. Second Examination, each admission 12 guineas. The fee payable on admission to the Fellowship by Members is 10 guineas and by non-Members 30 guineas, in addition to examination fees.

A Member of the College is admissible to the First Examination at any time after receiving his Diploma of Membership. A candidate who is not a Member is admissible after passing the First Professional Examinations of the English Conjoint Board in Anatomy and Physiology, or the equivalent examination in his University, on the production of certificates of attendance upon prescribed courses.

A Member of the College is admissible to the Second Examination at any time after having passed the First Examination, on producing evidence of having been engaged not less than six years in the study (or study and practice) of the profession.

A candidate who is not a Member of the College must possess the registrable surgical and medical degrees of universities recognised by the Council and must have been engaged in the study (or study and practice) of the profession for not less than four years subsequent to the date of obtaining the recognised qualification, one year of which shall have been spent in attendance on the Surgical Practice of a recognised hospital. The diploma of Fellow is not conferred upon successful candidates until they have attained the age of 25 years.

The Regulations may be obtained on application to the Director of Examinations, Examination Hall, Queen-square, London, W.C. 1.

SOCIETY OF APOTHECARIES OF LONDON.

The Pre-Medical and Primary examination is held quarterly. Part I. includes Chemistry, Chemical Physics; Practical Chemistry; Materia Medica and Pharmacy. Part II. includes Anatomy, Physiology, and Histology. This examination cannot be passed before the completion of twelve months' Practical Anatomy with Demonstrations, and these subjects cannot be taken separately except in the event of the candidate having previously passed in one.

The Final examination is held monthly except in September. Part I. Clinical Surgery: Principles and Practice of Surgery, Surgical Pathology, and Surgical Anatomy, Operative Manipulation, Instruments, and Appliances. Part II. Clinical Medicine: Medicine, Pharmacology, Pathology, and Morbid Histology; Forensic Medicine, Hygiene, Theory and Practice of Vaccination; and Mental Diseases. Part III. includes Midwifery, Gynæcology, and Diseases of New-born Children and the Use of Obstetric Instruments.

The course of study for the *Final examination* includes attendance on the Surgical and Medical Practice, with Post-mortem Examinations, at a hospital connected with a medical school for a period of three winter and three summer sessions, including a course of Practical Midwifery, with attendance on 20 Midwifery cases. The course of medical study must extend over five years, and the office of dresser or clinical clerk must be held at a hospital or other institution recognised by the Society. Three academic years (33 months) must elapse after a candidate has passed the examination in Anatomy and Physiology before he can complete the Final examination.

Evidence shall also be given of practical instruction in Infectious Diseases and in Mental Diseases (at a lunatic asylum or in the wards of an institution containing a special ward set apart for the treatment of mental diseases), and in any two of the following subjects: Ophthalmic Surgery, Laryngology with Rhinology and Otology, Dermatology, and Diseases of Children. Candidates intending to present themselves for examination are required to give 14 days' notice. The fee for the Licence is 20 guineas. Female candidates are admitted to examinations.

Master of Midwifery.—This diploma has now been instituted and the next examination will be on Monday, Nov. 18th, 1929. Candidates will be admitted to the examination who have been registered practitioners for at least one year, and who have held a resident appointment in an institution recognised by the Society for six months or more, and who for three months have attended an antenatal clinic and an infant welfare centre, also recognised by the Society. Until 1932 practitioners of ten years' standing may enter for the examination without further formality than the production of satisfactory evidence that they have made a special study of the subjects. The examination will be conducted by written papers and by clinical and oral tests.

The entrance fee for the examination is £10 10*s.* and a further fee, which at present is fixed at £10 10*s.*, will be paid before their admission to the Mastery, by those who have satisfied the examiners. Candidates for the examination must send in their certificates to the Secretary of the Society, Mr. Frank Haydon, who will supply any other information.

The examination offices are open from 10 A.M. to 4 P.M.; on Saturdays from 10 A.M. to 1 P.M. All letters should be addressed to the Secretary, Court of Examiners, Society of Apothecaries of London, Blackfriars, E.C. 4.

PHARMACEUTICAL SOCIETY.

THE SCHOOL OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN is recognised by the University of London. The Society conducts examinations for registration as (*a*) Chemist and Druggist and (*b*) Pharmaceutical Chemist

Courses of Instruction are given for the examinations in conjunction with University College.

An Intercollegiate two years' course for the Final Examination for the degree of B.Pharm. of the University of London is also given in conjunction with University College. Medical students are admitted to the lectures and laboratory work in any or all the courses. Certificates of instruction in the School are received by the Conjoint Board of the Royal Colleges and by the University of London. Graduates of approved Universities may carry out the research work necessary for the thesis for the Ph.D. of the University of London in the Society's Research Laboratories; this degree may now be taken in Pharmacognosy or Pharmacy in the Faculty of Medicine. Further information may be obtained from the Dean, Prof. Greenish, 17, Bloomsbury-square, London.

METROPOLITAN CENTRES AFFORDING POST-GRADUATE FACILITIES.

Certain organisations and institutions provide for the needs of the medical student in his cirriculum and for the post-graduate student requiring special forms of instruction and opportunities for clinical observation. Many of the institutions are recognised by the English Conjoint Examining Board as a place of study for the fifth year of the curriculum.

Special Diplomas in public health, tropical, psychological, and ophthalmic medicine, medical radiology and electrology, laryngology, otology, and tuberculosis are now granted in proof of intensive work along the different lines indicated. Of these, the Diploma in Public Health, being regulated by the General Medical Council, is registrable. Appointments to and promotion in the various Services are largely dependent on the possession of a particular diploma, and each syllabus of the special courses available at the institutions which follow, either with or without association with the Fellowship of Medicine, is planned to afford the necessary instruction.

The Special Diplomas are dealt with fully on p. 469, where the Bethlem Royal Hospital, the Maudsley Hospital, and the Diploma in Psychological Medicine are referred to. Similarly the Hospitals of the Metropolitan Asylums Board provide post-graduate as well as under-graduate facilities, while the hospitals of the Seamen's Hospital Society both supply the instruction necessary for the Diploma in Tropical Medicine and Hygiene, and coöperate in the activities of the Fellowship of Medicine and Post-Graduate Medical Association.

HOSPITALS OF THE METROPOLITAN ASYLUMS BOARD.—These hospitals, of which there are 18 in the metropolis and the near vicinity, will shortly come under the administrative powers of the London County Council. The Board hold classes of instruction in fevers at all the infectious hospitals at which ordinary medical students attend, but the only hospital to which a class of instruction for the diploma in public health is attached is the North-Eastern Hospital. This course of lectures and demonstrations (three months) on clinical practice and in hospital administration is given at the North-Eastern Hospital, St. Ann's-road, Tottenham, N. 15, by the medical superintendent, on Mondays and Wednesdays at 4.45 P.M., and alternate Saturdays at 11 A.M., beginning Thursday, Oct. 3rd, 1929. This course complies with the requirements of the revised D.P.H. regulations of the General Medical Council. Application for further information should be made to the Clerk to the Metropolitan Asylums Board, Victoria Embankment, London, E.C. 4.

SEAMEN'S HOSPITAL SOCIETY.—The Society possesses seven establishments: the Dreadnought Hospital at Greenwich, 250 beds; the Albert Dock Hospital, E. 16, 53 beds; the Hospital for Tropical Diseases, Endsleigh-gardens, W.C. 1, 56 beds; Tilbury Hospital, Tilbury Docks, Essex, 92 beds; Queen Alexandra Memorial Hospital, Marseilles, 60 beds; King George's Sanatorium for Sailors, Bramshott, Hants, 80 beds; and the Angas Home, Cudham, 36 beds. Total, 627 beds. It has also a Dispensary in the East India Dock-road from which patients are transferred to the hospitals. Courses of operative surgery and surgical pathology are arranged by the London School of Clinical Medicine at the Dreadnought Hospital.

The clinical teaching of the London School of Hygiene and Tropical Medicine is given at the Society's Hospital for Tropical Diseases, Endsleigh-gardens, W.C. 1.

THE FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.

Some 50 general and special London hospitals work in conjunction with this Association, which has its office at Room 28 in the House of the Royal Society of Medicine, 1, Wimpole-street, London, W. 1. Arrangements are made for courses in medicine and in surgery, occupying the whole or part of each day for periods of one to four weeks. Fees, £1 1*s.* to £7 7*s.* Special evening courses for the M.R.C.P. Examination are organised at intervals. Series of weekly (free) lectures (during the winter months) and clinical demonstrations in medicine and in surgery (except during August and September) are also arranged. Membership of the Fellowship is open to all qualified medical practitioners, the membership fee being 10*s.* per annum, which includes the subscription to the monthly *Post-Graduate Medical Journal*. Full information regarding the courses of study can be obtained from the Secretary.

GENERAL PRACTICE.

ROYAL NORTHERN GROUP OF HOSPITALS.—The Royal Northern Hospital, Holloway, London, N. 7, is the main institution of the Royal Northern Group of Hospitals, which includes the Royal Chest Hospital, City-road, E.C., Grovelands Hospital (Recovery Branch), Southgate, and the Reckitt Convalescent Home, Clacton-on-Sea. The total number of beds in the group is 400. Besides the honorary staff there are six anæsthetists, three pathologists, resident medical officer, resident house physician, three resident house surgeons, two resident

casualty officers, and one resident obstetric surgeon. The large rectangular and circular wards, each of which contains 25 beds, the children's ward for children under 5 years of age, the observation wards in the new Casualty Department, the two operation theatres, and out-patient department are designed with a view of offering the greatest facilities for clinical work. The Special Departments include the following: Fracture, genito-urinary and neurological, physico-therapeutic, pathological (under a director of clinical pathology), tuberculosis, venereal diseases, and X ray (recently remodelled). Patients are removed to the Recovery Branch by ambulance a few days after operation. Demonstrations are given daily in the wards and out-patient departments. Clinical assistants (qualified), clinical clerks, and pathological clerks are appointed in the general and special departments and may receive certificates at the end of their terms of office. A new maternity department has been opened, and the light department has been re-equipped.

Weekly lectures by members of the hon. medical and surgical staff are free to all medical practitioners. Special classes and demonstrations are being arranged for post-graduates. They include instruction in general medicine and surgery, and also lectures and demonstrations in special subjects at the Royal Northern and Royal Chest Hospitals.

PRINCE OF WALES'S GENERAL HOSPITAL, Tottenham, N. 15.—This hospital is in the midst of a densely populated neighbourhood and contains medical, surgical, gynæcological, and children's wards, having 200 beds. There are special departments for gynæcological cases, diseases of the eye, ear, throat, and nose, skin diseases, plastic surgery, medical electricity, radiography, and dentistry. Operations are performed every afternoon of the week (except Saturday) at 2.30 P.M. Clinical instruction, ordinarily including laboratory classes, and lectures are given in the wards and out-patient departments, laboratories, and lecture hall in connexion with the North-East London Post-Graduate College attached. There are five resident medical officers, and clinical assistants are appointed under certain conditions. Special intensive post-graduate courses are also held at intervals throughout the year. Further particulars in regard to the hospital may be obtained from Dr. S. C. Shanks, Secretary to the Medical Committee, 87, Harley-street, W. 1; or from Mr. T. H. C. Benians, F.R.C.S., Dean of the College, at the Hospital.

WEST LONDON HOSPITAL, Hammersmith, W.—This hospital has 220 beds. Attached to the hospital is the West London Post-Graduate College. The practice of the hospital is reserved exclusively for qualified men. Instruction is given in the medical and surgical out-patient rooms and demonstrations are given in the wards. Clinical assistantships are obtainable in the various general and special out-patient departments. Special classes are held in Diseases of the Throat and Nose, Skin, and Eye, and in Gynæcology, Medical Electricity, Operative Surgery, Bacteriology, Anæsthetics, Intestinal Surgery, Medical and Surgical Diseases of Children, Blood and Urine, Clinical Microscopy, Cystoscopy, Venereal Diseases, and Operative Ophthalmology, Radiography, X Ray Therapy. The accommodation for post-graduates consists of a lecture room, together with reading, writing, and class rooms. The hospital has a fully equipped pathological laboratory, at which instruction is given in elementary bacteriology. The certificate of the hospital is accepted by the Admiralty, War Office, Colonial Office, and India Office in cases of study leave. Further information can be obtained on application to the Dean, Sir Henry Simson, at the Hospital. Secretary of the Post-Graduate College Mr. C. Cole, and of the Hospital Mr. H. A. Madge.

LONDON TEMPERANCE HOSPITAL, Hampstead-road, N.W. (Established 1873; Incorporated 1917.)—The hospital contains 136 beds. The medical and surgical practice of the hospital is open to students and practitioners. Operations: Monday, 1.15 P.M., Tuesday, 2.30 P.M., Wednesday, 9 A.M. and 1 P.M., Thursday, 8 A.M., Friday, 10 A.M. and 3 P.M., and Saturday, 9 A.M. New Out-patient Departments for special diseases have been opened: Neurology, Diseases of the Stomach and Disorders of Digestion, Diseases of Women, Genito-urinary Diseases, Diseases of the Rectum, and Dermatology.

HAMPSTEAD GENERAL AND NORTH-WEST LONDON HOSPITAL.—In-patient Department: Haverstock Hill, N.W.; Out-patient Department: Bayham-street, Camden Town (138 beds—viz., 109 free, 8 isolation and observation, &c., and 21 paying or contributory). Serves Hampstead and the populous districts of Kentish Town and Camden Town. The out-patients, with the exception of Hampstead casualty and emergency cases, attend exclusively at the Out-patients' Department, Bayham-street, Camden Town. Further particulars from the Secretary at the hospital. Post-graduate work is in connexion with the Fellowship of Medicine.

QUEEN MARY'S HOSPITAL, Stratford.—This hospital has developed from the West Ham and Eastern General Hospital. It has 213 beds and ministers to a very poor public. Founded as a dispensary in 1861, and developing into a hospital in 1890, steady extensions have been made during this century. A Royal Charter was obtained in 1917, and the hospital has become a valuable charity with a full medical staff of physicians and surgeons, and specialists for gynæcology, obstetrics, ophthalmological surgery, radiology, and dental surgery. The Fellowship of Medicine and Post-Graduate Medical Association makes frequent use of the opportunities here offered.

Particulars may be obtained from Major Raphael Jackson, Secretary, Queen Mary's Hospital, Stratford, E. 15.

NEUROLOGY.

THE NATIONAL HOSPITAL, QUEEN-SQUARE, W.C.—The hospital, with the Convalescent Home at East Finchley and branch at Clapham Park, contains 265 beds and cots. The out-patient physicians attend every Monday, Tuesday, Thursday, and Friday at 2 P.M., and the physicians daily. Clinical clerks are appointed under physicians and clinical assistants to out-patient physicians. Post-graduate Courses of Lectures and Demonstrations are held three times every year, usually commencing in January, May, and October, and lasting eight weeks. Special Courses in Neurological Ophthalmology, Neuropathology, and the Anatomy and Physiology of the Nervous System are given. The Pathological Laboratory is available for special work under the Pathologist.

WEST END HOSPITAL FOR NERVOUS DISEASES.—This institution is recognised by the University of London as a school of instruction in Neurology for the M.D. degree, Branch III., and for the D.P.M. The Out-patient Department is in Welbeck-street, W.; the In-patient Department is at Gloucester-gate, Regent's Park, and contains 80 beds. Completely equipped with pathological and other special departments, the hospital offers every facility for instruction in Neurological subjects. In conjunction with the Bethlem Royal Hospital, it offers courses of instruction for the D.P.M. Additional series of clinical demonstrations, apart from the general practice of the hospital, are held regularly each session, and the hospital coöperates with the Fellowship of Medicine in the programmes of special post-graduate teaching organised by the Association. Appointments as Hon. Clinical Assistants in the Out-patient Department are open to registered medical practitioners. The Savill Memorial Prize (value £15) and Medal are offered biennially for competition among post-graduate students who have attended the practice of the hospital or any special course. Full particulars may be obtained from Dr. C. C. Worster-Drought, Dean, or J. P. Wetenhall, Secretary, 73, Welbeck-street, W.

HOSPITAL FOR EPILEPSY AND PARALYSIS, &c., Maida Vale, W. (85 beds).—Both in-patient and out-patient departments of this hospital are open free to students as well as to medical graduates. The out-patient department is open every week-day except Saturday at 2 P.M.

HEART AND LUNGS.

HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST, Brompton.—The hospital contains 350 beds. The recent provision of 25 (surgical) beds in a special block has increased the total number up to 350 (approximately). The Sanatorium at Frimley contains 100 beds and 50 beds for paying patients. Six house physicians reside in the hospital for a term of six months; their duties include attendance in the out-patient department. An additional month may be spent at the Sanatorium. Pupils are admitted to the practice of the hospital. Clinical Demonstrations are given throughout the year by members of the medical staff. Clinical assistants are appointed to the physicians in the out-patient department and clinical clerks to the physicians in the wards. The medical practice of the hospital is recognised by the English Conjoint Board and also by the University of London, the Apothecaries' Society, and the Army and Navy and Indian Medical Boards. The hospital is open to post-graduates and students. During the month previous to each conjoint examination the teaching will be as far as possible for students about to enter for the final examination. The hospital practice is open to post-graduate students.

MOUNT VERNON HOSPITAL (INCORPORATED), Northwood; CENTRAL OUT-PATIENT DEPARTMENT, Fitzroy-square, W.—The hospital contains 150 beds, Medical and Surgical. Clinical Demonstrations are given by the visiting Medical Staff at the hospital at Northwood. Clinical assistants are appointed to physicians in the wards and in the out-patient department.

CITY OF LONDON HOSPITAL FOR DISEASES OF THE HEART AND LUNGS, Victoria Park, E. 2.—Special Departments: Surgical, Laryngological, Radiological, Pathological, Electrocardiographic. Assistants are appointed to the Clinics, and a limited number of research workers to the Pathological Department. The in-patient staff visit generally in the afternoon; out-patients at 2 P.M. The post-graduate students are admitted on payment of fees which entitle them to attendance at clinics, post-mortem demonstrations, and operations. Special demonstration and lecture courses are provided, and a club room. Graduates desiring Assistantships in any department should apply to the head of the Special Department, Tuberculosis Dispensary (Boroughs of Bethnal Green and part Hackney).

NATIONAL HOSPITAL FOR DISEASES OF THE HEART, Westmoreland-street, London, W. (founded 1857).—The practice of the hospital, both in the wards and out-patient department, is open daily to post-graduates and others. Systematic courses of instruction, with lectures and clinical demonstrations, are arranged during the winter and summer sessions; in addition an intensive course, of a fortnight's duration, takes place in January, July, and October of each year. The hospital is fully equipped with all the modern instruments for the investigation of the diseases of the Cardiovascular system, and facilities exist for those requiring practical instruction in Electrocardiography, X Rays, and other graphic methods. Clinical Assistants in the Out-patient Department are appointed from time to time.

DISEASES OF WOMEN AND CHILDREN.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C. 1. (contains 252 beds).—The practice is open to students of both sexes who have completed four years of medical study and also to qualified medical men and women. The medical staff are recognised by the University of London as teachers in Diseases of Children. Arrangements have also been made with University College Hospital and the London School of Medicine for Women for the routine admission of their students of both sexes to clerkships and dresserships in the wards. Appointments are made every three months to eight medical clerkships, which are open to students of the hospital. Clinical instruction is given daily by members of the visiting staff. Clinical Clerks are appointed once a month. In the pathological department facilities are afforded to post-graduates for obtaining theoretical and practical instruction in Clinical Pathology and Bacteriology, and in Medical Biochemistry in the Pathological and Biochemical Laboratories. Courses of eight to ten Lecture-Demonstrations are given at weekly intervals twice a year in both subjects (Clinical Pathology and Bacteriology, and Biochemistry.) Time spent in clerking and dressing is recognised by the Universities of London, Oxford, and Cambridge, as well as by the English Conjoint Board as part of the final curriculum. These appointments are open to students of all recognised medical schools. In addition, special lectures in post-graduate work are held throughout each term of the year, as well as routine post-graduate instruction daily.

QUEEN CHARLOTTE'S MATERNITY HOSPITAL (formerly QUEEN CHARLOTTE'S LYING-IN HOSPITAL) AND MIDWIFERY TRAINING SCHOOL, Marylebone-road, N.W.—This hospital receives over 2300 patients annually, besides having a large out-patient department. Medical pupils are received at all times of the year. Pupils have unusual opportunities of seeing obstetric complications and operative midwifery, on account of the very large number of primiparous cases—nearly one-half of the total admissions. Clinical instruction is given on the more important cases which present themselves. They also receive valuable instruction in the Antenatal Department, where over 4000 patients attend yearly. Special Lecture-demonstrations are given by members of the staff. Certificates of attendance at this hospital are recognised by all the Universities, Colleges, and licensing bodies. Pupil midwives and maternity nurses are received and specially trained. A Residential College provides accommodation for students and qualified practitioners (both men and women), and is opposite the hospital, with which it is in telephonic communication. Arrangements have been made for Medical Students to receive the preliminary instruction in Practical Midwifery recommended by the General Medical Council.

ROYAL WATERLOO HOSPITAL FOR CHILDREN AND WOMEN, Waterloo Bridge-road, S.E.—This hospital, founded at the date indicated by its title, has recently undergone considerable extensions, and has now 130 beds, while the latest buildings include a nurses' home and a new operating theatre. It has a full staff of surgeons, physicians, and gynæcologists, and also special departments. A new orthopædic department is in use, and the physiotherapeutic and electrical department has recently been extended and re-equipped. There are facilities for post-graduates to attend the general and special clinics in medicine and surgery, including a genito-urinary clinic, a clinic for varicose veins, and the X ray department of gastro-intestinal diagnosis. Particulars of post-graduate courses, which are held from time to time, can be obtained from the Secretary or from the Fellowship of Medicine.

VICTORIA HOSPITAL FOR CHILDREN, Tite-street, Chelsea, S.W.—138 beds and a large out-patient department; the home at Broadstairs has 50 beds. Private wards in the Nurses' Home, named after H.R.H. Princess Mary (Viscountess Lascelles), at 29, Tite-street, adjacent to the hospital. Patients must be under the care of a consultant of one of the hospitals of London, and the question of payment for his fees is arranged between him and the child's parents. Application for admission should be made to the Secretary.

QUEEN'S HOSPITAL FOR CHILDREN (*late North-Eastern Hospital for Children*), Hackney-road, Bethnal Green, London, E. 2.—For the sick children of the poor under 14 years of age. 134 beds in London and 36 at the seaside branch, "Little Folks" Home, Bexhill.—Special departments in Ear, Nose, Throat, Skin and Eye, and Dentistry. Rheumatic Clinic in coöperation with L.C.C. schools weekly. A radiologist attends four times weekly. There are massage and light departments, and a special whooping-cough physician. The practice of the hospital is open to students by arrangement with the medical staff, and post-graduate instruction in children's diseases, lectures and demonstrations are given at times notified by the Fellowship of Medicine.

PADDINGTON GREEN CHILDREN'S HOSPITAL (42 beds).—This is a small hospital with a large out-patient department and a full staff, with eye, ear, skin, and dental departments. The facilities which it offers for observation of clinical practice are used by the Fellowship of Medicine.

HOSPITAL FOR WOMEN, Soho-square, W. (80 beds).—The teaching is available for post-graduates only, in limited numbers. Operations take place daily at 2 o'clock except on Saturdays. The X ray department is supplied with the latest installation both for diagnosis and treatment, and experience can also be gained in the treatment of malignant disease by means of radium. Incorporated is the London School of Gynæcology, comprising attendance in out-patient department, operating theatre, clinical lectures, and X ray treatment.

SAMARITAN FREE HOSPITAL FOR WOMEN, Marylebone-road, N.W. (70 beds).—Qualified practitioners are admitted as clinical assistants to both the in- and out-patient departments. Full particulars may be obtained from the Secretary to the Medical Committee at the hospital.

EAST LONDON HOSPITAL FOR CHILDREN AND DISPENSARY FOR WOMEN, Glamis-road, Shadwell, E. (136 cots).—Clinical instruction is given by the physicians and surgeons to the hospital to students in the fifth year of the curriculum. Two clinical clerkships for qualified or unqualified students are open every three months subject to reappointment if desired. Clinical assistants (qualified men only) are from time to time appointed in the out-patient department. Any additional information may be obtained on applying to the Secretary.

CHELSEA HOSPITAL FOR WOMEN, Arthur-street, Chelsea, S.W. 3.—This hospital has 100 beds, and a certain number are reserved for patients paying £5 5*s*. a week and small fees to the surgeons for operations. There is a convalescent home of 32 beds at St. Leonards. At a large out-patient department the patients are seen at a nominal payment.

THE EVELINA HOSPITAL, Southwark (76 cots), and THE BELGRAVE HOSPITAL (76 cots), Clapham-road, also give facilities for out-patient practice.

OPHTHALMOLOGY.

ROYAL LONDON OPHTHALMIC HOSPITAL (Moorfields, 1804–1899), City-road, E.C. (138 beds).—The attendance at Moorfields Eye Hospital is now very large. Operations are performed daily from 10 A.M. to 1 P.M., and four surgeons attend on each day. Students are admitted to the practice of the hospital, and special courses of instruction are given, which extend over a period of five months, by members of the Surgical Staff, beginning in October and March. The instruction and classes are arranged so as to meet the requirements for the various diplomas in Ophthalmology, both the preliminary examination in Anatomy, Physiology and Optics, and those subjects required in the second part. Students of the hospital are eligible as house surgeons or clinical and junior assistants; these are appointed every three months.

ROYAL WESTMINSTER OPHTHALMIC HOSPITAL, Broad-street, Holborn, W.C. (85 beds, including 14 rooms for paying patients).—This hospital has recently removed from its original site at Charing Cross to much larger premises, well adapted for teaching purposes. The clinics are held in the afternoons from 1 P.M. Operations are performed daily in the theatre at 3 P.M. Lectures and practical classes in the various branches of Ophthalmology, including Operative Surgery, Bacteriology, and Pathology, are held during the winter and summer sessions at 5 P.M. The practice of the hospital is open to both men and women practitioners, and medical students. Post-graduate students at the hospital are eligible for appointment as house surgeon, assistant house surgeon, refraction assistant (six appointments paid), and senior and junior clinical assistants.

ROYAL EYE HOSPITAL, St. George's-circus, Southwark, S.E.—There are 44 beds and 2 cots. Clinical instruction is given to students and post-graduates daily at 2.30 P.M., and Lectures, Demonstrations, and Laboratory Classes are arranged in preparation for examinations in Ophthalmology. Apparatus has been installed for the Microscopy of the Living Eye. Post-graduate students are eligible for appointment as Clinical Assistants and as Refraction Officers.

CENTRAL LONDON OPHTHALMIC HOSPITAL, Judd-street, St. Pancras, W.C.—This hospital has 40 beds, and clinical teaching is given daily. Classes of instruction in the use of the ophthalmoscope, with demonstrations on cases, and also classes on other subjects, to meet the requirements of the Conjoint Board for the D.O.M.S., and of the University of London for the M.S. in Ophthalmology, are given during the winter months, commencing in October. This school is recognised as a teaching institution by the Universities of London and Oxford, as well as the English Conjoint Board. It receives a portion of the pupils of the University College Hospital for the purposes of ophthalmic training. The Pathological and Bacteriological Laboratories have been rendered available for the use of any ophthalmic surgeons who desire to send specimens for examination. A small fee is charged for a report. A Clinical Demonstration is held by members of the staff at the Central London Ophthalmic Hospital at 5 P.M. on the first Tuesday of every month. Students of medicine and doctors are admitted free.

GENITO-URINARY AND VENEREAL DISEASES.

LONDON LOCK HOSPITAL AND HOME. (Founded 1746.)—In the institution at Harrow-road, W., there are 202 beds. In the male department and out-patient department in Dean-street, Soho, W., there are 38 beds. Male and female patients are seen at 91, Dean-street, Oxford-street, W.1, at any time from 9 A.M. until 9 P.M. daily, including Sundays. Intravenous injections are given at every clinic. Irrigations for males are given daily from 8 A.M. to 9 P.M. Female patients and children are seen daily at 283, Harrow-road, Paddington, W.9, from 9 A.M. until 8 P.M. Irrigations for females are given at any time. The hospital is linked up with the Fellowship of Medicine; special courses of lectures are held in May and November each year, and application for tickets should be made direct to the Secretary of the Fellowship. Only a limited number of practitioners and students are permitted to attend the practice of the Female Lock Hospital, and application should be made to the Dean at the Male Lock Hospital, between the hours of 11 A.M. and 5 P.M., or to the Secretary at the Head office.

ST. MARK'S HOSPITAL FOR CANCER, FISTULA, AND OTHER DISEASES OF THE RECTUM, City-road, E.C.1. (Founded 1835.) (62 general beds and 10 private beds.)—For men and women. Operations are performed on Mondays, Wednesdays, and Thursdays at 2.30 P.M. Medical practitioners and students are invited to the operations and to the clinical instruction in the wards and in the out-patient department. Two fortnightly courses held during year in coöperation with the Fellowship of Medicine.

ST. PETER'S HOSPITAL FOR STONE AND OTHER URINARY DISEASES, Henrietta-street, Covent Garden. (Established 1860.) (30 beds for men and 2 beds for women and children).—The X ray department is diagnostic only. A loan of radium salts for research work was made by the British Empire Cancer Campaign in 1925. Medical practitioners and students are invited to the clinical instructions which are given in the wards and out-patient department daily, excepting that the only out-patient clinic open to medical women is that held at 2 P.M. Fridays for women and children, and to the operations in the theatre on Mondays at 2.30 P.M., and Wednesdays and Fridays at 2 P.M. Post-graduate Courses of Lectures are given from time to time, dates being advertised in the medical journals.

ALL SAINTS' HOSPITAL FOR GENITO-URINARY DISEASES.—The in-patient department (30 beds) is at Finchley-road, and the terms of admission are free or by payment according to means. The out-patient department in the Vauxhall Bridge-road provides clinical instruction through the Fellowship of Medicine, in addition to which demonstrations in cystoscopy and other branches of genito-urinary work are available for all medical practitioners at the Out-patient Department on Wednesday, Thursday, and Saturday afternoons, at 1.30 P.M., without fee.

ORTHOPÆDICS.

ROYAL NATIONAL ORTHOPÆDIC HOSPITAL, Great Portland-street, W. (450 beds.)—This institution is a good example of the fusion of small and scattered activities for the creation of an effective whole. The three orthopædic hospitals of the metropolis were combined for the formation of this central institution at the instance of the King's Hospital Fund, with the result that the grants from this Fund and the income from subscriptions can now be used to far better purpose and with economy. The hospital has also been approved by the Ministry of Health for the treatment of tuberculosis, the connexion between orthopædics and the therapeutics required in many forms of tuberculosis having become obvious. Country branch at Brockley Hill, Stanmore. (214 beds). Both branches of the hospital are residential schools for physically defective children, certified by the Board of Education. Post-graduate courses of 14 days each are held twice yearly.

EAR, NOSE, AND THROAT.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.—The hospital is open daily to all qualified medical practitioners on presentation of their visiting cards. Demonstrations of the cases and clinical instruction are given daily by the chief surgeon of each clinic. Lectures each Friday at 4 P.M. An intensive Course of Lectures (especially suitable to D.L.O. students), with Operative Surgery Class, Peroral Endoscopy Class, and Pathology Class is given twice yearly—in May and October. Preparatory courses in Methods of Examination and Diagnosis at frequent intervals. Consultations on interesting cases take place on the fourth Wednesday in each month at 4 P.M. Clinical Assistants are appointed and are expected to hold office for at least three months. They are required to attend twice weekly at 1.30 o'clock for the afternoon, and at 4.30 o'clock for the evening clinics. New wing, with complete out-patient department and additional wards, was opened in August last.

GOLDEN-SQUARE THROAT, NOSE AND EAR HOSPITAL (with which is amalgamated the London Throat Hospital, Great Portland-street).—Clinical instruction in the diagnosis and treatment of disease is given daily in the out-patient department from 2 to 5 P.M., and on Tuesdays and Fridays from 6.30 to 9 P.M. There is an annual out-patient attendance of over 55,000. Minor operations are performed on Mondays, Wednesdays, and Fridays, at 9.30 A.M. New wards and in-patient operating theatres have been opened recently, and the hospital now contains 95 beds. Practitioners and medical students are admitted to the practice of the hospital, and clinical assistants are appointed periodically.

METROPOLITAN EAR, NOSE, AND THROAT HOSPITAL. (Founded 1838.)—The hospital is in Fitzroy-square, W. The Out-patient Department is opened daily (Saturdays excepted) at 2.30 P.M. to all medical practitioners and senior students for acquiring clinical instruction and technical knowledge. Operations upon in-patients are performed on Tuesdays, Wednesdays, and Thursdays at 10 A.M. Clinical Assistants are appointed as vacancies occur.

SKIN.

LONDON SCHOOL OF DERMATOLOGY, ST. JOHN'S HOSPITAL FOR DISEASES OF THE SKIN, 49, Leicester-square, W.C.—In-patient Department (33 beds) at 262, Uxbridge-road, W. Out-patient Clinics are held daily at 2 and 6 P.M. (Saturdays 2 P.M. only), when demonstrations are given on the cases presenting themselves. The Chesterfield Lectures, constituting a systematic course in dermatology, are given on Tuesdays and Thursdays at 5 P.M., from October to March, by the hon. medical staff of St. John's Hospital and the physicians in charge of the Dermatological Departments of the London Teaching Hospitals. The lectures are free to those attending the practice of the hospital and to registered medical students. At the end of the course an examination is held for the Chesterfield Medal in Dermatology, and is open to those who have attended three-quarters of the lectures. The Electrical Department is open daily from 2 to 4 P.M., except on Wednesdays and Saturdays. Laboratory Courses in the Pathology and Bacteriology of the Skin can be arranged.

THE LONDON SKIN HOSPITAL (Fitzroy-square), and the HOSPITAL FOR DISEASES OF THE SKIN (Blackfriars-road), admit students to their practice, which is among out-patients, daily at 2.30.

CENTRES OUTSIDE LONDON AFFORDING EDUCATIONAL FACILITIES.

Nearly every hospital of a general character in the country having more than 150 beds falls within this category, and certain of them have already been noticed in connexion with the universities to which their clinical practice is attached. The hospitals vary much in size and scope.

The following alphabetical list includes the provincial hospitals which are recognised by the English Conjoint Board for a part of the required training in medical and surgical practice through clerkships and dresserships.

BATH ROYAL UNITED HOSPITAL, Bath.—This hospital contains 212 beds, 72 of which are situated in Combe Park, Bath, and are for *paying patients* only, and possesses X Ray, Massage, Bacteriological Departments, a Pathological Laboratory, and a fine library. Secretary: Mr. J. M. Sheppard. V.D. Clinics are held on Tuesdays (for women), and on Fridays and Saturdays (for men), at 5 P.M., and Ear, Throat and Nose Clinics on Thursdays, at 4 P.M.

BEDFORD COUNTY HOSPITAL, Bedford.—This hospital has 124 beds, including 15 beds in the paying and 13 beds in the maternity wards, X Ray and Pathological Departments. There is in connexion with the institution a convalescent home (20 beds) at Aspley Heath, nr. Woburn Sands. The hospital is approved by the University of London for the M.D. and M.S. Examinations. Secretary: Mr. Beaucham Wadmore.

BRADFORD ROYAL INFIRMARY, Bradford.—This hospital contains 215 beds and, in addition, has 5 recovery beds at the Woodlands Convalescent Home Rawdon. There are 4 Honorary Consulting Physicians, 1 Honorary Consulting Surgeon, 1 Honorary Consulting Laryngologist, 1 Honorary Consultin Gynæcologist, 1 Honorary Consulting Pathologist, an

1 Honorary Consulting Dental Surgeon. The Acting Staff consists of 4 Honorary Physicians, 4 Honorary Surgeons, 1 Honorary Radiologist, 1 Honorary Laryngologist, 1 Honorary Ophthalmic Surgeon, 1 Honorary Dental Surgeon, 1 Honorary Assistant Physician, 2 Honorary Assistant Surgeons, 1 Honorary Assistant Radiologist, 5 Anæsthetists, 1 Pathologist, 1 Physician in charge of Radium Therapy Department, 1 Resident Surgical Officer, 1 House Physician, and 4 House Surgeons. There are special clinics for Orthopædic cases, for Electrotherapeutic and Sunlight Treatment, and for Radium Therapy. A new hospital of 360 beds with a self-contained block for 70 paying patients is in construction. Secretary-Superintendent: Mr. J. J. Barron.

COVENTRY AND WARWICKSHIRE HOSPITAL, Coventry (established 1840).—There are 307 beds available at the Main Hospital, and 40 beds at the Alcock Convalescent Hospital, Keresley (three and a half miles distance), which is used as an annexe. At the Main Hospital there are separate Medical, Surgical, Maternity, Children's and Accident Wards, also separate Ophthalmic Block complete with its own Theatre. There are separate departments for Clinics for Ear, Nose and Throat Diseases, X Ray, Electrical, and Sunlight Clinics, also V.D. Clinic. There is also an up-to-date Pathological Laboratory.

DERBYSHIRE ROYAL INFIRMARY, Derby.—This general hospital of 338 beds was rebuilt in 1892–94. In recent years there have been numerous alterations and additions to keep pace with modern requirements. The hospital is built on the pavilion system and provides, in addition to the usual Medical and Surgical blocks, a separate Ophthalmic block of 40 beds, a separate Children's block of 34 beds (Medical and Surgical), Gynæcological Wards, and an Ear, Throat, and Nose Department. There is a large and well-equipped Out-patient Department, also separate Orthopædic, X Ray, Electrical, Pathological, and Venereal Diseases Departments. The Honorary Visiting Staff consists of 2 Honorary Physicians, 3 Honorary Surgeons, 1 Honorary Ophthalmic Surgeon, 1 Honorary Gynæcologist, 1 Honorary Assistant Physician, 1 Honorary Assistant Surgeon, 1 Honorary Assistant Ophthalmic Surgeon, 1 Honorary Pathologist, and 2 Honorary Surgeon Dentists. The salaried Medical Staff consists of a non-Resident Staff of 1 Surgeon-in-charge of X Ray and Electrical Departments, 1 Surgeon-in-charge of Venereal Diseases Department, 4 Anæsthetists, and a Resident Staff of 4 House Surgeons, 1 House Physician, and 1 Assistant House Surgeon and Casualty Officer. Registered Medical Students are admitted to witness the medical and surgical practice on payment of fees. Superintendent and Secretary: Mr. Walter Banks, F.C.I.S.

GLOUCESTERSHIRE ROYAL INFIRMARY AND EYE INSTITUTION, Gloucester.—This hospital has 145 beds. Secretary: F. J. Symons. An Electrical and Massage department has been established and Venereal Clinic opened. Also Ear, Nose, and Throat department, X Ray department, Ultra-violet Ray department, Orthopædic department, Dental department, and Pathological Laboratory.

HULL ROYAL INFIRMARY, Hull.—This hospital contains 272 beds, and since its establishment in 1782 has undergone steady additions and improvements, including up-to-date Ophthalmic, Radiological Nose, Throat and Ear, Dental, V.D., Violet Rays and Pathological Departments. Recent extensions include a new Operating Theatre, Nurses' Home, and extensions to the old X Ray, Electrical, and Out-patient Departments. Work is in progress on the erection of a new 500-bed hospital at Sutton-on-Hull. The staff consists of 2 Consulting Physicians, 3 Consulting Surgeons, 2 Consulting Ophthalmic Surgeons, 3 Physicians, 4 Surgeons, 1 Ophthalmic Surgeon, 1 Aural Surgeon, 2 Radiologists, 1 Pathologist, 2 Assistant Physicians, 2 Assistant Surgeons, 1 Assistant Ophthalmic Surgeon, 1 Assistant Aural Surgeon, 1 Dental Surgeon, 1 Assistant Dental Surgeon, 4 Anæsthetists, 1 Officer-in-charge of V.D. Department. Resident Staff: 1 House Physician, 1 House Surgeon, 1 Assistant House Physician, 2 Assistant House Surgeons, 1 Assistant Surgeon to Special Departments, 1 Casualty Officer. An annexe at Withernsea has accommodation for 30 patients.

KENT AND CANTERBURY GENERAL HOSPITAL, Canterbury.—The hospital contains 120 beds. Pupils of the staff are admitted to the practice of the hospital. Operations daily. Special departments include Ophthalmic, Ear, Nose and Throat, Venereal, Orthopædic, Electrical, Actinotherapeutic, X Ray, and Bacteriological. Secretary: Mr. W. T. Southwood.

LEICESTER ROYAL INFIRMARY, Leicester.—At the General Infirmary there are 333 beds, and at the Children's Hospital in connexion, 70; venereal diseases, 17; total 420 beds. A reconstruction scheme has been carried out, and £250,000 spent on bringing the accommodation of the institution to a modern standard of efficiency. This scheme has included the provision of two modern operating theatres, two new wings, and self-contained out-patients' department. The Children's Hospital has been reconstructed and enlarged by the addition of a third ward at a cost of £14,500. Pathological Laboratories and post-mortem rooms were erected at a cost of £11,000, also an orthopædic out-patient department at a cost of £9500, £5000 of which was provided by the Freemasons of the province as their war memorial. The Nurses' Home has recently undergone enlargement by 60 bedrooms, and now provides for 160 nurses and staff. An old central wing is being replaced by a new wing of three wards, and other structural improvements comprise reconstruction of the kitchens, new temporary ward of 30 beds, and a new venereal disease department. There are eleven resident salaried medical officers—viz., four house surgeons, two house physicians, three anæsthetists, and two dressers. Most of the posts are filled half-yearly and afford exceptional opportunities for post-graduate experience and senior students. Dressers are given an honorarium. Students who seek resident Dresserships should apply to the House Governor and Secretary. A post-graduate course of lectures is arranged annually by the Leicester Medical Association, and also clinical classes are held for graduates preparing for M.D. and M.R.C.P.

NORFOLK AND NORWICH HOSPITAL, Norwich.—This hospital has at present 350 beds. There is a convalescent home with accommodation for 35 patients at Cromer. The Honorary Medical and Surgical Staff consist of 2 Consulting Physicians, 3 Consulting Surgeons, 1 Consulting Radiologist, 1 Consulting Ear, Nose and Throat Surgeon, 3 Physicians, 3 Surgeons, 1 Assistant Physician, 3 Assistant Surgeons, 1 Surgeon, Ear, Nose and Throat Department; 2 Ophthalmic Surgeons, 1 Radiologist, 1 Pathologist, and 2 Dental Surgeons. There are 3 Honorary Anæsthetists and Honorary Assistants to the Ear, Nose and Throat Department, the X Ray Department, Ophthalmic Department, and Cardio-Vascular Clinic. Other medical officers are: 1 Assistant Pathologist and 1 Assistant to the Venereal Diseases Department. The Resident Medical Staff consists of 1 House Physician, 3 House Surgeons, 1 House Surgeon to the Ear, Nose, Throat, and Eye Department, and 1 Casualty Officer. A private patients' home has recently been opened. Students are admitted to the practice of the Hospital for a fee of £5 5*s.* for six months. House Governor and Secretary: Mr. Frank Inch.

NORTHAMPTON GENERAL HOSPITAL, Northampton.—Two new wings were opened in 1904 and the old buildings entirely renovated and rearranged. In 1926 a new isolation block of 30 beds was opened. The number of beds is 230. There is an up-to-date Pathological Laboratory; also, X Ray and Therapeutic Department and V.D. Clinic. Two new operating theatres are being built.

NORTH STAFFORDSHIRE ROYAL INFIRMARY, Hartshill, Stoke-on-Trent.—The New Infirmary, opened in 1869, is built on the pavilion plan, has accommodation for about 346 patients, including Children's wards, a Bacteriological and Pathological department, and a department for the treatment of Diseases of the Eye, X Ray and Electrical department (including Ultra-Violet Ray Lamps); Cardiographic department, a department for the treatment of Diseases of the Ear, Nose, and Throat, an Orthopædic department, an Electrocardiograph department, Dental department, and Venereal Diseases clinics, including daily Intermediate Treatments. Recent extensions comprise a new ward block, new X Ray and Orthopædic departments with connecting corridors to the existing infirmary, large extensions to the nurses' home, a new boiler house, new chimney stack, and a new laundry. Secretary and House Governor: Mr. W. Stevenson.

NOTTINGHAM GENERAL HOSPITAL.—There are at this hospital 377 beds available for medical and surgical patients, and 54 beds are in the detached branch known as "The Cedars" Branch of the General Hospital. The Medical and Surgical Staffs consist of 1 Honorary Consulting Physician, 2 Honorary Consulting Surgeons, 1 Honorary Consulting Physician in Venereal Diseases, 3 Honorary Physicians, 4 Honorary Surgeons, 2 Honorary Assistant Physicians, 2 Honorary Assistant Surgeons, 2 Honorary Aural Surgeons, 1 Honorary Dermatologist, 2 Honorary Anæsthetists, 2 Honorary Assistant Anæsthetists, 1 Honorary Surgeon Dentist, 1 Honorary Medical Officer in Charge of X Ray and Electrotherapeutic department 1 Pathologist, and 5 Clinical Assistants. The Resident Medical Staff consists of 2 House Physicians, 4 House Surgeons, 1 Aural House Surgeon, and 1 Casualty Officer. The special departments are the Ear, Nose and Throat, Skin, Dental, Massage and Exercise, X Ray, Orthopædic, Electrotherapeutic, Ultra-Violet Light. House Governor and Secretary: Mr. P. M. MacColl.

ROYAL BERKSHIRE HOSPITAL, Reading.—This hospital, which contains 237 beds, was enlarged in 1912, 1925, and 1928, and includes an Out-patient Department, a Casualty Department, an X Ray Department, Electrotherapeutic and Massage Department, an Orthopædic Department, a V.D. Clinic, a Laboratory, an Eye Theatre, Eye Wards, a Maternity Ward, and two Motor and One Horse ambulances. The hospital is approved as a Training School for Nurses, and by the Ministry of Health for V.D. Treatment.

ROYAL DEVON AND EXETER HOSPITAL, Exeter.—The hospital contains 225 beds (including special children's wards) and has a good library, museum-post-mortem room, and pathological laboratory. Attendance on the practice of this hospital qualifies for all the examining boards. There is also a Private Nursing Staff attached to the hospital. For particulars as to fees, &c., apply to the Matron. A new wing was added in 1897 and the "Victory" wing for the treatment of discharged disabled soldiers and sailors completed and opened in 1922. Doctors in practice may use the museum and library. The Electrical Treatment Department, opened in 1907, was enlarged in 1925, and now forms one of the most important sections of the hospital. At the department for the treatment of genito-urinary diseases there are three sessions per week, two for men at 3 P.M. and 7 P.M., and one for women at 3 P.M.

ROYAL HANTS COUNTY HOSPITAL, Winchester.—158 civilian beds. Secretary: Mr. Herbert Maslen.

ROYAL HOSPITAL, Portsmouth (180 beds).—There are Pathological, X Ray, Massage, and Medical and Surgical Out-patient Departments.

ROYAL SALOP INFIRMARY, Shrewsbury.—This hospital has 150 beds. In-patients, 1780; out-patients 1436; out-patients' attendances, 27,519; accidents and casualties, 4374; dental cases, 278. Secretary-Superintendent: J. W. Noble. A New Wing for the reception of Women and Children, capable of accommodating some 40 patients, has now been erected.

ROYAL SOUTH HANTS AND SOUTHAMPTON HOSPITAL, Southampton.—This hospital contains 214 beds, but will be increased to 250 beds shortly, with every facility for clinical instruction. Special Departments: Ear, Nose, and Throat; X Ray; Massage and Electricity; Ultra-Violet Ray; Venereal Diseases. Large Out-patient Department.

ROYAL SUSSEX COUNTY HOSPITAL, Brighton (225 beds).—This hospital affords ample facilities for students, possessing a large out-patient department, including Ophthalmic, Dental, Dermatological, Gynæcological, X Ray, and Electrotherapeutic sections, and a well-appointed clinical research and bacteriological department. The hospital does not take resident pupils, but out-pupils may attend the practice of the hospital for any period not exceeding two years, on payment in advance of a fee, not exceeding 20 guineas, as the Board of Management shall direct.

SALISBURY GENERAL INFIRMARY, Salisbury.—This hospital contains 151 beds. Maternity and antenatal and ophthalmic wards; maternity and child welfare clinic.

SOUTH DEVON AND EAST CORNWALL HOSPITAL, Plymouth.—This hospital has 245 beds (including 10 for venereal diseases in a separate building). Special departments include Pathological, X Ray, Deep-Therapy, Cardiographic, Ultra-Violet Rays, Electrotherapeutic, and Orthopædic; also medical and surgical out-patients. Pensioners are received as in-patients, and are also treated as out-patients.

STAFFORDSHIRE GENERAL INFIRMARY, Stafford (established 1766).—This hospital has 100 beds, and has a Training School for Nurses.

WEST OF ENGLAND EYE INFIRMARY, Exeter (64 beds).—Students of the Exeter Hospital can attend the practice of the Eye Infirmary. A ward is set aside for newly-born babies suffering from infectious eye diseases. Mothers with babies are accommodated.

THE ROYAL HOSPITAL, WOLVERHAMPTON (240 beds).—Special Departments for Children, Infectious Cases, Gynæcology, Maternity, Ear, Throat, and Nose Diseases, Electrotherapeutic and X Rays, Orthopædics, Artificial Sunlight, Venereal Disease, Pathological and Biochemical Laboratories, Dentistry, Radium, and Electrocardiograph. There is an excellent medical library. The Resident Staff consists of one Resident Medical Officer, two House Surgeons, and two Casualty Officers and Anæsthetists. Women's Department, one Resident Medical Officer. Pupils are allowed to witness the whole of the practice of the hospital, and to be present at operations, and have every opportunity of acquiring a practical knowledge of their profession. The hospital is recognised by the various Examining Bodies for a part of the requisite attendance on Medical and Surgical Practice. A course of Practical Pharmacy is given by the Pharmacist. Fees on application. Applications should be made to the Honorary Secretary of the Medical Committee.

WORCESTER GENERAL INFIRMARY, Worcester.—This hospital has 132 beds. Pupils are taken by members of the Honorary Medical and Surgical Staff. New X Ray and Electrical and Wolfram Arc Light, Ear, Nose and Throat, and Orthopædic Departments have been erected and are now in use. Additional accommodation for the Honorary Staff and Out-patients and also an Outdoor Shelter in connexion with the Children's Ward have been built as a memorial to King Edward VII., and fire-escape staircases erected.

YORK COUNTY HOSPITAL, York.—This hospital contains 180 beds. There are balconies for outdoor treatment, two installations of X ray apparatus, electrotherapeutic and massage department, actinotherapy installation, Zünd-Burguet apparatus for treatment of chronic deafness, and clinical laboratory. There are clinics for Functional Nervous Disorders and Venereal Diseases.

II.—SCOTLAND.

THE UNIVERSITIES.

UNIVERSITY OF EDINBURGH.

Four Degrees in Medicine and Surgery are conferred by the University of Edinburgh—viz., *M.B.*, *Ch.B.*, *M.D.*, and *Ch.M.* The degree of *Ch.B.* shall not be conferred on any person who does not at the same time obtain the degree of *M.B.*, and the degree of *M.B.* shall not be conferred on any person who does not at the same time obtain the degree of *Ch.B.* No one is admitted to the degrees who has not been engaged in study for five years.

Candidates for the degrees of M.B. and Ch.B. must have attended for at least three academic years the medical and surgical practice either of the Royal Infirmary, Edinburgh, or of a general hospital elsewhere which accommodates not fewer than 80 patients and possesses a distinct staff of physicians and surgeons. They must have attended courses of instruction in Clinical Surgery and Clinical Medicine each of nine months, and courses of instruction in all the subsidiary subjects. They must have attended a course in Clinical and Practical Midwifery and have personally conducted 12 cases.

With respect to the places and institutions at which the studies of the candidate may be prosecuted the following regulations have effect :—Three of the five years of medical study must be spent in the University of Edinburgh. The remaining two years may be spent in any University of the United Kingdom, or in any Indian, Colonial, or Foreign University or medical school recognised for the purpose by the University Court.

Women are admitted to graduation in medicine under the same conditions as men.

Bachelors of Medicine and *Bachelors of Surgery* may proceed to the degrees of *Doctor of Medicine* and *Master of Surgery* after they have spent one year in the medical or surgical wards respectively of a hospital, or the Military or Naval Medical Services, or in scientific work bearing directly on their profession, or two years in practice. In each case an examination must be passed and a thesis submitted.

Post-graduate Instruction.—The University takes part in the Courses given under the auspices of the Edinburgh Post-graduate Courses in Medicine. In the departments of the Faculty of Medicine provision is made for research by students of graduate standing. In the University laboratories facilities will be provided for approved candidates for the Degree of Ph.D.

In connexion with the University and Royal Colleges Post-graduate Instruction is given each year, chiefly in the Summer Vacation (July–September). Special Courses are arranged for, and particulars may be had on application to the Hon. Secretary, Post-graduate Courses in Medicine.

The University of Edinburgh is especially rich in scholarships and prizes in medical subjects. Full particulars concerning these, as well as concerning the fees at different stages, can be obtained from the Dean of the Medical Faculty.

Royal Infirmary, Edinburgh.—1006 beds, including 42 cots for children. The clinical work of the Edinburgh student is done at the Royal Infirmary. Courses of Clinical Medicine and Surgery are given by the physicians and surgeons to male and female students. Special instruction is given on Diseases of Women, Physical Diagnosis, Diseases of the Skin, Diseases of the Eye, the Ear, the Larynx, and the Teeth. Separate wards are devoted to Venereal Diseases, Diseases of Women, Diseases of the Eye, the Ear, Throat and Nose, and the Skin, and also to cases of Incidental Delirium or Insanity. There is also a large and complete Radiological Department. Post-mortem examinations are conducted in the anatomical theatre by the pathologist and his assistants, who also give practical instruction in Pathological Anatomy and Histology.

The appointments are: 1. Resident physicians and surgeons are appointed and live in the house free of charge. The appointment is for six months, but may be renewed at the end of that period by special recommendation. 2. Non-resident house physicians and surgeons and clinical assistants are appointed for six months. The appointment may be renewed for a like period by special recommendation. 3. Clerks and dressers are appointed by the physicians and surgeons. These appointments are open to all students and junior practitioners holding hospital tickets. 4. Assistants in the Pathological Department.

Facilities are given in connexion with the Post-graduate Courses arranged by the Edinburgh University and the two Royal Colleges jointly.

Royal Hospital for Sick Children, Sciennes-road, Edinburgh.—120 beds, and fitted with every modern improvement. A fully equipped out-patient department (medical and surgical) is conducted daily. Systematic courses of instruction, which qualify for graduation in the Edinburgh University and elsewhere, are given thrice throughout the year by the staff. Each course consists of 50 meetings and combines medicine and surgery. Post-graduate Courses of Lectures are held during the summer vacation. Full particulars with regard to teaching can be obtained from the Dean's office, University New Buildings, Edinburgh.

Eye, Ear, and Throat Infirmary of Edinburgh (with which is incorporated the Edinburgh Eye Dispensary), 6, Cambridge-street, Lothian-road.—Clinical Lectures and Instruction are given in this institution, which is open at 1 o'clock daily for out-door patients for Eye Diseases; Mondays, Thursdays, and Saturdays at 12 noon, and Tuesdays and Fridays at 4 P.M. for outdoor Ear, Nose, and Throat Patients. Patients whose diseases require operations or extra care are accommodated in the house (10 beds). Practical Ophthalmoscopic Classes may be arranged, and Clinical Assistants are appointed from time to time. A Post-graduate Course in Diseases of the Ear, Nose, and Throat is held each academic term, commencing in May, October and January, and continuing for six weeks. The next course commences in October. The class meets at 5 P.M. on Tuesdays and Fridays, and the instruction, which is practical, is supplemented by lantern demonstrations. Full particulars from the Secretary, 32, Charlotte-square.

UNIVERSITY OF GLASGOW.

The University of Glasgow is both a teaching and a degree-granting body, but admits to graduation only candidates whose preliminary examination and course of study conform to its own regulations. Within certain limits instruction given by recognised medical schools and teachers may be accepted, but not less than one-half of the subjects other than clinical must be taken in this or some other recognised university, and at least two years of the course must be taken in Glasgow University. Seven degrees, open both to men and women, are conferred: *M.B.* and *Ch.B.* (always conjointly), *M.D.* and *Ch.M.*; *B.Sc.* in Public Health; *D.Sc.* in Public Health; *B.Sc.* in Pharmacy; and *Ph.D.* in the Faculty of Medicine. A Diploma in Public Health (*D.P.H.*) is also granted.

All information as regards the extent and standard of the Preliminary Examination may be obtained by application to the Secretary, Scottish Universities Entrance Board, 81, North-street, St. Andrews.

For the degrees of M.B. and Ch.B. a curriculum of five years is required. The candidate must attend a course or courses of instruction in each of the following subjects of study, extending over not less than the number of terms specified in each case, and including such class examinations as may be prescribed in connexion with the several courses:—Chemistry (including Organic Chemistry), with Practical Chemistry, three terms; Physics (with practical work), one term; Botany (with practical work), one term; Zoology (with practical work), one term; Anatomy and Practical Anatomy, five terms; Physiology and

Practical Physiology, three terms; Materia Medica and Therapeutics (together or separately), each subject, one term; Pathology and Practical Pathology, three terms; Medical Jurisprudence and Public Health (together or separately), each subject, one term; Midwifery and Diseases peculiar to Women and to Infants, two terms; Surgery, two terms; Medicine, two terms. Candidates must attend for at least three years the Medical and Surgical Practice of a recognised hospital accommodating at least 80 patients and having a distinct staff of physicians and surgeons. At least nine months' hospital attendance is required on both Clinical Surgery and Clinical Medicine with nine months more of general hospital practice; the student must have acted for six months as clerk in medical and dresser in surgical wards, and must have had six months' outdoor practice; he must also have attended a course of Mental Diseases and of Practical Pharmacy (25 meetings), must have been properly instructed in Vaccination at a public vaccination station, and must have attended at least 20 cases of labour and the Practice of a Lying-in Hospital. The University also requires further study in various special subjects: Ophthalmology, Diseases of the Ear, Diseases of the Throat and Nose, Venereal Diseases, Tuberculosis, Fevers, Vaccination. The final year consists of three intensive terms of study: one devoted to Midwifery and Diseases of Women, one to Surgery, and one to Medicine.

There are four Professional Examinations, the first comprising Botany, Zoology, Physics, and Chemistry; the second comprising Anatomy and Physiology; the third comprising Materia Medica and Therapeutics and Pathology; and the fourth or final, comprising Medical Jurisprudence and Public Health, Surgery and Clinical Surgery, Practice of Medicine and Clinical Medicine, and Midwifery and the Diseases Peculiar to Women and to Infants.

The degrees of M.D. (*Doctor of Medicine*) *and Ch.M.* (*Master of Surgery*) are granted to candidates, not under 24 years of age, who have previously obtained the double bachelorship on completing examinations, in Clinical Medicine for M.D. and in Surgical Anatomy, operations on the dead body, and Clinical Surgery for Ch.M. The higher degree of Doctor of Philosophy (Ph.D.) is also conferred in the Faculty of Medicine. Candidates must already have obtained a degree (or equivalent diploma) from an approved University or College and must prosecute a course of special study or research for two or three years and given evidence of satisfactory progress. A thesis must be presented for approval by the Senate on the recommendation of a Special Committee. The candidate may be required to undergo an oral or other examination on the subject matter of the thesis.

Post-graduate Medical Teaching is available under the auspices of Glasgow Post-Graduate Medical Association, which is representative of practically all the Teaching Institutions in Glasgow. Weekly demonstrations for practitioners are given throughout the winter and spring, and comprehensive courses of instruction during the summer and autumn. There is a General Medical and Surgical Course during the last two weeks of August and the first two weeks of September. This is a whole-time course and includes most of the subjects of interest to the general practitioner. The forenoons are occupied with General Medicine and Surgical Diagnosis and Minor Surgery in the Royal Infirmary and in the Victoria Infirmary. In the afternoons special subjects are dealt with in some of the special hospitals or in the special departments of the general hospitals—two subjects each afternoon. On the four Saturday forenoons Tuberculosis and Infectious Fevers are demonstrated at Ruchill Fever Hospital. Arrangements have also been made whereby a limited number of graduates may become attached to wards or out-patient departments nominally as clinical assistants for definite periods throughout the year. As such they work under the direct supervision of the physician or surgeon in charge, and carry out such detailed investigations as directed. Further information may be obtained from the Secretary of the Association, 9, Woodside-terrace, Glasgow.

There are many Bursaries, Scholarships, and Prizes in connexion with the Medical Course.

ROYAL INFIRMARY, Glasgow.—The ancient connexion between the University of Glasgow and the Royal Infirmary was revived in 1911, when four University Chairs and several University Lectureships were established at the infirmary. New Lectureships in Materia Medica and Pathological Biochemistry were established recently, and this year a lectureship in Bacteriology has been founded. St. Mungo's College which embraces and continues the original Royal Infirmary Medical School, is situated in the infirmary grounds. The infirmary has, including the Ophthalmic Department, over 800 beds. In addition to the large medical and surgical departments, there are special wards for diseases of women, of the throat, nose, and ear, skin, eye, burns, septic cases, and biochemical investigation. The wards are open to Women Students. Six house physicians and nine house surgeons, who board in the hospital free of charge, are appointed every six months; also five non-resident house physicians, eight non-resident house surgeons, and one non-resident dental house surgeon. Clerks and dressers are appointed by the physicians and surgeons. As a large number of cases of acute diseases and accidents of a varied character are received, these appointments are very valuable and desirable. There is a modern and fully equipped Electrical Pavilion and Massage Department, and year by year the latest and most approved apparatus for diagnosis and treatment has been added. Post-graduate Classes are held during August and September in Clinical Medicine, Clinical Surgery, Clinical Gynæcology, Diseases of the Skin, Biochemistry, Diseases of the Throat, Nose and Ear, and in Diseases of the Eye. Tutorial Classes for senior students are also held in August and September.

For information regarding fees and other particulars, application should be made to the Superintendent.

GLASGOW WESTERN INFIRMARY.—This hospital of 600 beds adjoins the University. Special wards are set apart for Diseases of Women, Throat, Nose, and Ear, and for Affections of the Skin. In the out-patient department there are special clinics for Diseases of Women and for Diseases of the Throat, Ear, Teeth, Skin, Venereal Disease, and Electrotherapeutics. The Clinical Courses are given by the physicians and surgeons, each of whom conducts a separate class, and students require to enter their names at the beginning of the session for the class which they propose to attend. Special instruction is given to junior students by tutors or assistants, and clinical clerks and dressers are selected from the members of the class. All the courses of clinical instruction are recognised by the University of Glasgow and the other boards in the kingdom. In the Pathological and Bacteriological Departments the courses are both systematic and practical, and extend through the winter and following summer; these are likewise recognised by the University for graduation. In addition Post-graduate Courses are held. Eighteen resident assistants are appointed annually, without salary, from those who have completed their course. In the Clinical Laboratory students receive laboratory instruction from the lecturer on clinical methods. A School of Massage, Medical Electricity, and Swedish Remedial Exercises has been established to qualify for the Certificate of the Chartered Society of Massage and Medical Gymnastics. Secretary: J. Matheson Johnston, C.A.

VICTORIA INFIRMARY, 67, Carlton-place, Glasgow.—This institution, which has 380 beds, is the third of the extensive general hospitals in Glasgow to afford opportunity for clinical instruction to students. In addition to a full general staff there is a clinical research laboratory with pathologists and bacteriologists attached, radiological instructor, and full assortment of specialists. The Bellahouston

Dispensary, also with a clinical staff, is conducted in connexion with the Victoria Infirmary. For further particulars of the clinical practice application should be made to the Secretary and Treasurer.

THE ANDERSON COLLEGE OF MEDICINE, Dumbarton-road, Glasgow, W.1.—Courses are given which qualify for all the licensing boards and for the Universities of Oxford, Cambridge, London, Durham, Edinburgh, and Glasgow (the latter two under certain conditions). Extensive accommodation is provided for Practical Anatomy, Practical Chemistry, Practical Botany, Practical Zoology, Practical Physiology, Practical Pharmacy, Operative Surgery, and Public Health. Ample provision has also been made for the comfort of students. Women students are admitted on the same terms as men, and the Carnegie Trust extends its benefactions to students of the College. (Full particulars may be obtained from the Carnegie Trust Offices, Merchants' Hall, Edinburgh.)

Candidates for the L.D.S. can obtain the full medical curriculum in Anatomy, Chemistry, Physiology, Surgery, Practice of Medicine, and Materia Medica. The courses special to Dentistry are conducted at the Dental Hospital, Glasgow.

Communications relating to the College to be addressed to the Secretary of the Medical Faculty, Communications relating to the Preliminary Examination in General Education to be addressed to the Educational Institute Office, 47, Moray-place, Edinburgh; and relating to the Triple Qualification and to the Dental Qualification to be addressed to Royal Faculty Hall, 242, St. Vincent-street, Glasgow.

QUEEN MARGARET COLLEGE (Women's Department of the University).—This is an integral part of the University of Glasgow. The classes are taught by professors of the University and other lecturers appointed by the University Court, and it is governed by the University Court and Senate. The curricula, regulations, and fees are the same as those of the male students, and the University degrees are open to women on the same conditions as to men. The school of medicine is a special feature of the College, and gives full preparation for the medical degrees of the University. The women students attend classes in the various University Buildings at Gilmorehill and Queen Margaret College, the Royal Infirmary, the Western Infirmary, and the Victoria Infirmary. Facilities for clinical work are given in the Royal, Western and Victoria Infirmaries, in the Maternity, Royal Sick Children's, and other hospitals. The Arthur Scholarship is open every third year to students of first year; other Bursaries are open in Arts and Medicine, and women are admitted to certain University bursaries and fellowships.

ST. MUNGO'S COLLEGE AND GLASGOW ROYAL INFIRMARY.—The classes in St. Mungo's College qualify for the medical qualifications of the English, Scotch, and Irish Conjoint Boards, for the dental diplomas of the English, Irish, and Scottish Boards and, under certain conditions, for the various universities, including the University of London. Students who have fulfilled the conditions of the Carnegie Trust are eligible for the benefits of this Trust during the whole course of their studies at St. Mungo's College.

Further particulars can be obtained from the Secretary of the Medical Faculty.

ROYAL HOSPITAL FOR SICK CHILDREN, St. Vincent-street, Glasgow.—This institution consists of: (1) a hospital at Yorkhill containing 275 cots, built on an elevated and central site close to the University, and opened in July, 1914; (2) a Dispensary, or Out-patient Department, in West Graham-street, opened in October, 1888; and (3) a country branch at Drumchapel, Dumbartonshire, containing 80 cots, opened in 1903. Children treated must not be over 13 years of age, nor suffer from infectious diseases. In 1928 there were 6492 patients treated in the wards, and the number of attendances of out-patients was 90,585. There are one professorship and four lectureships in the University of Glasgow in connexion with the hospital, one professorship and one lectureship on the Medical Diseases of Infancy and Childhood, one lectureship on Surgery and Orthopædics in Relation to Infancy and Childhood, one lectureship on Biochemistry in Relation to Infancy and Childhood, and one research lectureship on the Pathology of the Diseases of Infancy and Childhood. The lectures are both systematic and clinical, but particularly and chiefly the latter. In addition, special facilities are given for post-graduate study.

Full information may be obtained from the Medical Superintendent.

THE GLASGOW ROYAL MATERNITY AND WOMEN'S HOSPITAL, Rottenrow.—The average daily number of patients in the hospital is 140, and of the 4000 cases admitted to the wards per annum, over 60 per cent. are classified as abnormal. There are also about 3500 mothers attended per annum in their own homes. The work of the antenatal wards with their 40 beds is supplemented by large antenatal clinics where over 4000 new patients are seen in the course of the year. Splendidly equipped Research Laboratories were opened in 1926. The Visiting Staff of the hospital includes a Pædiatrician, who gives daily attendance. The practice of the hospital affords a wonderful field for post-graduate study and experience. In addition to the joint courses for post-graduates as organised by the Glasgow Post-Graduate Association, the resources of the hospital are always available for those who wish to make a special study of obstetrics. Inquiries should be addressed to the House Superintendent.

ROYAL SAMARITAN HOSPITAL FOR WOMEN, Glasgow. Increased to 160 beds by building extensions completed in 1927. It offers excellent facilities for clinical instruction in the diseases peculiar to women. Lectures and clinical demonstrations are given by members of the surgical staff to students and to post-graduates; and the hospital is represented on the Board of the Glasgow Post-Graduate Medical Association formed for coördinating post-graduate medical teaching in all the hospitals. The Royal Samaritan Lectureship in Gynæcology is a University Lectureship associated with the hospital.

For further information, application may be made at the hospital, or to the Secretary, 200, St. Vincent-street, Glasgow.

GLASGOW LOCK HOSPITAL, 41, Rottenrow, Glasgow. Contains 80 beds for the treatment of females suffering from Venereal Diseases. There is also a Labour Ward, and a well-equipped Dispensary for out-patient attendances. There is a Lecture Room and a Laboratory, equipped with modern appliances, where University classes on the subject are dealt with. Post-graduate classes are also held. Recently the hospital has been completely renovated and modernised. Full information from the Secretary and Treasurer, Mr. J. Neilson Gray, LL.B., 65, Bath-street, Glasgow.

GLASGOW OPHTHALMIC INSTITUTION, 126, West Regent-street, and 131, Wellington-street (30 beds and six cots).—This institution is administered by the Royal Infirmary. Clinical and systematic courses of lectures for students during the winter and summer sessions. Operations on Wednesdays, Thursdays, and Fridays. Post-graduate classes and demonstrations are arranged during the summer. For information regarding fees and other particulars, application should be made to the Superintendent, Royal Infirmary.

GLASGOW EYE INFIRMARY, Berkeley-street and Charlotte-street.—The wards and dispensary are recognised by the University of Glasgow for the purpose of instruction in ophthalmology for graduation in medicine, and by the Royal Colleges of Physicians and Surgeons of England for the Diploma in Ophthalmic Medicine and Surgery. A Venereal Centre has been established, and a Branch Dispensary has been opened in Clydebank. Post-graduate Classes are held. Secretary and Acting Treasurer, Mr. William M. Moore, 171, West Regent-street, Glasgow.

GLASGOW EAR, NOSE, AND THROAT HOSPITAL, 306, St. Vincent-street (52 beds).—At out-patient and indoor departments clinical instruction is given. A Research Department has now been installed. Post-graduate Courses are held during the year. Secretary: D. N. Mackay, 144, St. Vincent-street, Glasgow.

UNIVERSITY OF ST. ANDREWS (UNITED COLLEGE ST. ANDREWS AND UNIVERSITY COLLEGE, DUNDEE).

Four Degrees in Medicine and Surgery are conferred by the University of St. Andrews—viz., *M.B.*, *Ch.B.*, *M.D.*, *Ch.M.*, a Diploma in Public Health, and Diploma in Dental Surgery (*L.D.S.*).

The extent and standard of the Preliminary Examination is determined by the Scottish Universities Entrance Board constituted under Ordinance No. 70 of the Scottish University Courts (General No. 3—Regulations as to Admission to the Scottish Universities for purposes of graduation), in accordance with the terms of that Ordinance. A degree in Arts or in Science in any of the Universities of the United Kingdom and in some colonial and foreign universities exempts. The Preliminary Examination for graduation in Medicine and Surgery, Arts or Science, of the University of St. Andrews is accepted as equivalent to the Registration Examination required by the General Medical Council (the certificate to include the required subjects). Also the Final Examination for a degree in Arts or Science.

Degrees of Bachelor of Medicine and Bachelor of Surgery.—A pre-registration examination is held in Physics and Chemistry. Candidates must have been engaged in medical study for at least five years. In each of the first four years the candidate must have attended at least two courses of instruction in one or more of the subjects of study specified below, each course extending over a session of not less than five months, either continuous or divided into two terms, or, alternatively, one such course along with two courses, each extending over a session of not less than two and a half months. During the fifth or final year the candidate shall be engaged in clinical study for at least nine months at the Infirmary of Dundee or at one or more of such public hospitals or dispensaries, British or foreign, as may be recognised for the purpose by the University Court. The candidate must have received instruction in each of the following subjects of study, including such examinations as may be prescribed in the various classes—viz., Anatomy, Practical Anatomy, Chemistry, Materia Medica, Physiology, Practice of Medicine, Surgery, Midwifery and the Diseases peculiar to Women and Infants, Pathology, Bacteriology, Practical Chemistry, Physics, Elementary Botany, Elementary Zoology, Practical Physiology, Practical Pathology, Forensic Medicine, and Public Health. The candidate must have attended for at least three years the Medical and Surgical Practice either of the Infirmary of Dundee or of a General Hospital elsewhere with not fewer than 80 patients, with a distinct staff of physicians and surgeons, and recognised for the purpose by the University Court. Additional subjects of study are Practical Pharmacy, Mental Diseases, Practical Midwifery, Operative Surgery, Vaccination, Children's Diseases, Fevers, Ophthalmology, Diseases of the Ear, Throat, and Nose, Anæsthetics, Dermatology, Venereal Diseases, Tuberculosis, and Post-mortem Examinations.

With respect to the places and institutions at which the studies of the candidate may be prosecuted the following regulations shall have effect:—1. Two of the five years of medical study must be spent in the University of St. Andrews. 2. The remaining three years may be spent in any University of the United Kingdom or in any Indian, Colonial, or Foreign University recognised for the purpose by the University Court, or in such medical schools or under such teachers as may be recognised for the purpose by the University Court. Women are admitted to graduation in Medicine.

Professional Examinations for the Degrees of Bachelor of Medicine and Bachelor of Surgery.—Each candidate will be examined both in writing and orally, and also clinically where the nature of the subject admits, in the following divisions—viz., first, in Botany, Zoology, Physics, and Chemistry; second, in Anatomy and Physiology; third, in Materia Medica, Pathology and Bacteriology, Forensic Medicine and Public Health; and fourth, in Surgery, Clinical and Operative Surgery, Practice of Medicine and Clinical Medicine, and Midwifery and Gynæcology (Systematic and Clinical).

UNIVERSITY COLLEGE, DUNDEE.—The Medical School in St. Andrews University is carried on as follows. Part or whole of the medical curriculum of St. Andrews University must be taken here. Provision is made by St. Andrews University for instruction in the work of the first two years, including Anatomy and Physiology, in both St. Andrews and Dundee. The last three years of the curriculum must be taken in Dundee in University College, which is a constituent part of St. Andrews University.

ROYAL INFIRMARY, Dundee (461 beds).—In addition to the ordinary Medical and Surgical Wards, there are special departments for Midwifery (In- and Out-door), for Diseases of Women, of Children, of the Eye, of the Ear, Nose, and Throat, and of the Skin; and for Clinical Pathology, Radiology, Electrotherapeusis, and Electrocardiography. An extension providing for a new X Ray Department and Massage Department and for additional Operation Theatre accommodation has been opened recently, a new Maternity Department is being built at a cost of £32,000, and a new Dispensary at a cost of £25,000. Clinical teaching is given to male and female students by the Honorary Staff; post-mortem examinations are conducted by the pathologists. All courses of instruction are recognised by the University of St. Andrews and the other Universities and Boards of the United Kingdom. Ten Resident Medical Officers are appointed every six months. Clinical clerks and dressers are attached to the Physicians and Surgeons; and Students are appointed as assistants in the pathological department. Further information may be obtained from the Medical Superintendent.

UNIVERSITY OF ABERDEEN.

The University of Aberdeen grants four degrees in Medicine and Surgery—viz., *M.D.*, *Ch.M.*, *M.B.*, and *Ch.B.* The Degree of Doctor of Philosophy (*Ph.D.*) is also granted in the Faculty of Medicine.

Degrees of M.B. and Ch.B.—Candidates, before entering on the curriculum, must have passed the Preliminary Examination or hold a qualification recognised as exempting from such examination, have attained the age of 17, and have passed the Pre-registration Examination in Physics and Chemistry.

The curriculum for the degrees extends over a period of five years, during which attendance is required in the following subjects: Botany, Zoology, Physics, Chemistry (Systematic and Practical), Anatomy (Systematic and Practical), Physiology (Systematic and Practical), Materia Medica and Therapeutics, Practical Pharmacy, Pathology (Systematic and Practical), Medical Jurisprudence, Public Health, Surgery, Medicine, and Midwifery.

Candidates must attend for at least three years the medical and surgical practice of a recognised hospital; they must have attended courses of at least nine months in clinical medicine and clinical surgery, and have acted as clerk in the medical and dresser in the surgical wards of a hospital. Attendance is required on the practice of a dispensary or the out-practice of a hospital and also on courses in Mental Diseases, Fevers, Ophthalmology, Post-mortem Examinations, Venereal Diseases, Tuberculosis, Radiology,

X Ray, Therapeutics and Electrical Treatment, and Clinical Chemistry, and other special subjects. The candidate is also required to have been properly instructed in Vaccination and to have attended at least 20 Midwifery cases.

Degrees of M.D. and Ch.M.—Candidates for either of these degrees must already hold the degrees of M.B. and Ch.B. of Aberdeen. A thesis (in duplicate) has to be presented and an examination has to be passed in Clinical Medicine (or in some special Department of Medical Science) or Clinical Surgery, as the case may be.

Degree of Ph.D.—For this degree candidates must pursue a course of special study or research during a period of nine academical terms as Research Students in the University of Aberdeen or in any College or Institution that may be affiliated thereto. A Thesis (in duplicate) must be presented for approval.

A diploma in Public Health is granted by the University to graduates in Medicine of a University in the United Kingdom, after a special examination.

Scholarships and Prizes.—In the Faculty of Medicine of the University of Aberdeen there are the following Bursaries, Scholarships, and Prizes:—Bursaries: about 15 Bursaries (competition and presentation) are open each year, of £15 to £45 per annum in value, most of them being tenable for three years. Scholarships: five Post-graduate Scholarships, value £36 to £160 per annum. Prizes and Medals: 15 Gold Medals and Prizes for proficiency in special departments.

ABERDEEN ROYAL INFIRMARY (366 beds).—The main clinical work of the students is done in the infirmary with its general and special facilities, including a Department of Clinical Chemistry.

ABERDEEN ROYAL MENTAL HOSPITAL.—This hospital contains about 900 beds. The class of Mental Diseases meets at the University of Aberdeen, and clinical instruction is given at the hospital during three months in summer. Physician-Superintendent, Dr. R. Dods Brown.

OTHER HOSPITALS.—Students have the opportunity of attending the following institutions: City Fever Hospital, Sick Children's Hospital, General Dispensary, Lying-in and Vaccine Institutions, and Ophthalmic Institution.

SCOTTISH MEDICAL CORPORATIONS GRANTING DIPLOMAS.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH, ROYAL COLLEGE OF SURGEONS OF EDINBURGH, ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.

These Colleges have made arrangements by which, after one series of examinations, held in Edinburgh or Glasgow, or both, the student may obtain the diplomas of the three bodies. This is the Scottish Conjoint Board.

The three bodies grant their Single Licences only to candidates who already possess legal qualifications in Medicine or Surgery.

The hospitals which are recognised by the Scottish Conjoint Board as places where professional study for their diplomas can be pursued are all those institutions which feed the medical faculties of the universities, as well as all the places which are recognised by the English and Irish Conjoint Boards.

Professional Education.—The candidate must produce certificates or other satisfactory evidence of having attended the following separate and distinct courses of instruction: Physics, three months; Elementary Biology, 2 terms; Elementary Organic Chemistry, one term; Anatomy, Practical Anatomy, 5 terms; Theoretical, including Biochemistry and Biophysics. 5 terms; Physiology, Materia Medica, 2 terms; Pathology (including Practical Pathology), 3 terms; Practice of Medicine, 2 terms; Clinical Medicine, 3 terms; Principles and Practice of Surgery, 2 terms; Clinical Surgery, 3 terms; Midwifery and Gynæcology, 2 terms; Diseases of Children one term; Medical Jurisprudence, one term; and Public Health, one term. The certified attendance on lectures, demonstrations, and practical work must not be less than three-fourths of the total number of roll-calls. Every student undergoes a course of Practical Midwifery, but before attending at labours he is required to attend a course of lectures on Surgery and Midwifery and to hold the offices of Clinical Medical Clerk and Surgical Dresser. He must also attend for two and a half months' instruction in Practical Pharmacy; the certificate to be signed by the teacher, who must be a member of the Pharmaceutical Society of Great Britain, or the superintendent of the laboratory of a public hospital or dispensary, or a registered practitioner who dispenses medicines to his patients, or a teacher of Practical Pharmacy.

The student must attend for 27 months the Medical and Surgical practice of a public general hospital containing on an average at least 80 patients available for clinical instruction, and possessing distinct staffs of physicians and of surgeons. He must act as Surgical Dresser and Medical Clinical Clerk for not less than nine months in the wards in each case, and receive practical instruction in administration of anæsthetics. He must attend for three months the practice of a public dispensary especially recognised by any of the above authorities, and three months' attendance at the out-patient department of a recognised general hospital. This attendance should be made after the student has passed the First and Second examinations.

Candidates are also required to attend the following courses: Diseases and Injuries of the Eye, three months; Insanity, three months; Infectious Diseases, three months; Gynæcology, three months; Diseases of Children, three months.

The curriculum lasts for five years, the fifth year being devoted to clinical work.

There are four professional examinations:—

First Examination includes Systematic and Practical Biology.

The *Second Examination* must be Written, Practical, and Oral, and consist of the following subjects:—(1) Anatomy and Embryology, and (2) Physiology, including Histology (if not included in Anatomy), Biochemistry, and Biophysics. Candidates may be admitted to this Examination on production of the necessary certificates of curriculum.

The *Third Examination* must be Written, Practical and Oral, and consist of the following subjects:—(1) Pathology, including Bacteriology and Morbid Anatomy, and (2) Pharmacology (Theoretical and Practical), including Pharmacological Chemistry, the Principles of Therapeutics, the methods of Treatment by Vaccines and Sera, and Prescription Writing. Candidates may be admitted to this Examination on production of the necessary certificates of curriculum.

The *Final Examination* must consist of the following subjects[1]:—(1) Medicine, including Therapeutics, Applied Anatomy and Physiology, and Clinical Pathology with Practical Medicine; (2) Surgery, including Applied Anatomy and Physiology, Clinical Pathology, with Practical Surgery; (3) Midwifery and Diseases of Women, Clinical Obstetrics and Gynæcology, with Practical Midwifery; and (4) Medical Jurisprudence and Public Health. Medicine, Surgery, and Midwifery must be taken together, and Medical Jurisprudence and Public Health, and not earlier than on the conclusion of five Winters and five Summers of Medical Study, provided that a period of 36 months has elapsed since passing the Second Professional Examination. The Schedule for the

[1] Candidates at the Final Examination may be examined on Diseases of Children, Fevers, Tuberculosis, Insanity, Skin Diseases, Diseases and Injuries of the Eye, Diseases of the Ear, Throat, and Nose, Radiology, Venereal Diseases, Orthopædics Vaccination, and Anæsthetics.

Final Examination must contain a summary of the entire Course of Study, and, properly attested or proved by Certificates, must be lodged with the Inspector, and the fee paid, not later than one week before the examination. At the same time there must be produced a Certificate to show that the Candidate is not less than 21 years of age. No Candidate can be exempted from examination on any subject of the Final Examination (with the exception of Medical Jurisprudence and Public Health) unless he has already passed in the subject at this Board.

In addition to the Written and Oral Examinations, all Candidates must be subjected to Clinical Examinations in Medicine, Surgery, and Midwifery and Gynæcology, which shall include the Examination of Patients, Physical Diagnosis, the Clinical use of the Microscope and of other instruments, Clinical Chemistry, Surgical Appliances, Bandaging, Surface markings, Skiagrams, &c. The Oral Examination include the recognition of specimens. All Candidates for the Final Examination must complete the three portions (Medicine, Surgery, and Midwifery) within a period of 19 months.

There are four periods of examination annually.

The Registrar in Edinburgh is Dr. David Thomson, 49, George-square; and the Registrar in Glasgow, Mr. Walter Hurst, 242, St. Vincent-street, to whom fees and certificates must be sent for the respective examinations, and from whom particulars of fees can be obtained.

SCHOOL OF MEDICINE OF THE ROYAL COLLEGES, Edinburgh.—The number of students varies much in the classes and subjects. It is within the limit to say that about 1000 students avail themselves each session of the opportunity of attending the school. The lectures qualify for the University of Edinburgh and other Universities, the Royal Colleges of Physicians and Surgeons of London, Edinburgh, and Dublin, the Faculty of Physicians and Surgeons of Glasgow, and other Medical and Surgical and Public Boards. Special courses of instruction for dental students are also included in the curriculum of this school. The practical classes and laboratories will open and the lectures commence on Oct. 1st. In accordance with the statutes of the University of Edinburgh one-half of the qualifying classes required for graduation may be attended in this school. The regulations require that the fee for any class taken for graduation in Edinburgh shall be the same as that for the corresponding class in the University. The whole education required for graduation at the University of London may be taken in this school. Post-graduate Courses are conducted in conjunction with the University. Further particulars regarding the school, also its calendar (price 6*d.*) may be had on application to the Dean of the School, Surgeons Hall, Edinburgh.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH.

In addition to the diplomas granted by the Scottish Conjoint Board the Royal College of Physicians grants its Single Licence to candidates already possessing legal qualifications for professional practice.

The Royal College of Physicians of Edinburgh grants a *Membership* and a *Fellowship*.

Membership.—A candidate, who must be a Licentiate of a British or Irish College of Physicians, or a graduate in medicine of a University, approved by the Council, and 24 years of age, is examined in medicine, therapeutics, and in any branch of the departments of medicine specially professed, such as general pathology, psychology, public health, obstetrics, gynæcology, diseases of children, tropical medicine, or medical jurisprudence.

Fellowship.—The Fellows are selected from the ranks of the *Members*.

ROYAL COLLEGE OF SURGEONS OF EDINBURGH.

The Royal College of Surgeons of Edinburgh admits to the examination for its Single Licence any candidates who hold a Diploma in Medicine of any British, Indian, or Foreign university or of any British College of Physicians, or of the Society of Apothecaries of London or Apothecaries' Hall, Dublin, granted under the provisions of the Medical Act, 1886, whose preliminary examination and course of professional study is proved to be sufficient to fulfil the requirements of the College, or to those who have passed a full examination for any of the above. Female practitioners are admitted to the Licence of the College and also to the Fellowship, and the regulations apply to practitioners of either sex.

The College grants a diploma of Fellowship after examination to the holders of British surgical degrees or diplomas and the holders of recognised degrees of the Universities of Canada, Australia, New Zealand, and the Indian Empire.

The Fellowship.—Candidates must be 25 years of age and in practice for at least two years. The examination is written and viva voce, and includes surgery and surgical anatomy, operative surgery, and clinical practice. One optional subject must also be taken, the range of these specialisms covering nearly every branch of medicine. Candidates are not allowed to appear for more than three times at the examinations. One month's notice of intention to appear for examination must be given by the candidate to the College.

THE ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.

The Royal Faculty of Physicians and Surgeons of Glasgow grants a Fellowship and a Licence to be held separately. The Licence is granted as a separate qualification to qualified practitioners in Medicine after examination in surgery, including surgical anatomy and clinical surgery.

Fellowship.—The Fellowship of the Faculty is granted after examination in medicine or surgery, together with an optional subject, which may be anatomy or physiology or be selected from any special branch of medicine or surgery. Fourteen days' notice must be given by the candidate to the Faculty. In certain circumstances Fellows may be elected as a mark of distinction.

III.—IRELAND.

THE UNIVERSITIES.

UNIVERSITY OF DUBLIN, TRINITY COLLEGE (SCHOOL OF PHYSIC).

Matriculation.—University students take the Entrance of Trinity College and a Junior Freshman Term or a special Medical Preliminary; Extern Students, any examination recognised by the General Medical Council.

Pre-registration Examination in Elementary Physics and Chemistry.—Before beginning the five years' Medical curriculum students must pass an examination in elementary Physics and Chemistry. This examination is held at the end of September, in January, in March, and in July. Courses in preparation for it may be taken in the School of Physic.

Degrees in Medicine (*M.B.*), *Surgery* (*B.Ch.*), *and Midwifery* (*B.A.O.*).—Candidates for these degrees must be of B.A. standing and must be for at least five academic years on the books of the Medical School, reckoned from the date of registration. The Arts course may be taken concurrently with the Medical course, and the B.A. degree need not be taken before

the final medical examinations, but the Medical degrees are not conferred without the Arts degree. The following courses must be attended:—(1) Botany, Zoology, Physics and Chemistry; Descriptive and Applied Anatomy; Histology, Physiology and Applied Physiology; Pathology and Bacteriology; Materia Medica and Therapeutics; Medical Jurisprudence and Hygiene; Practice of Medicine; Surgery; Midwifery and Gynæcology. (2) Three courses of nine months' attendance on the Clinical Lectures of Sir Patrick Dun's or other recognised Hospital; (3) Practical Vaccination, one month's instruction; (4) Mental Disease, three months; (5) Practical Midwifery with Clinical Lectures, including not less than 20 personally conducted cases, six months; (6) Ophthalmic Surgery, three months. Three groups of examinations have to be passed. Preliminary Scientific Examination, including Physics and Chemistry, Botany, and Zoology. The Intermediate Medical, Part I., including Anatomy, Physiology, and Organic Chemistry; and Part II., including Applied Anatomy and Applied Physiology; and the Final Examination, which is divided into Part I., Materia Medica and Therapeutics, Hygiene and Jurisprudence, Pathology and Bacteriology; and Part II., Medicine, including Clinical Medicine and Mental Diseases; Surgery, including Operative and Ophthalmic Surgery; Midwifery and Gynæcology. Part I. may be passed in the fourth year, and Part II. completed at the end of the fifth.

Doctor in Medicine.—A Doctor in Medicine must have passed all the qualifying examinations and must be a B.A. of three years' standing. He must also submit a thesis and pass an Examination before the Regius Professor of Physic.

Master in Surgery.—A Master in Surgery must be a Bachelor in Surgery of the University of Dublin of not less than three years' standing, and must produce satisfactory evidence of having been engaged for not less than two years from the date of his registration in the study, or study and practice, of his profession. He must then pass a special examination.

Master in Obstetric Science.—A Master in Obstetric Science must be a Bachelor in Obstetric Science of two years' standing, and must produce evidence of having been engaged in the study of Obstetric Medicine and Surgery during two years. He is then required to pass a special examination.

Diploma in Gynæcology and Obstetrics.—A post-graduate diploma is conferred upon registered medical practitioners who take a six months' course at the Rotunda Hospital or other recognised institution, a six months' course in Trinity College, and then pass a special examination. The minimum time required for the complete course is nine months.

Bachelor in Dental Science and Master in Dental Science.—The regulations under which these degrees are awarded can be obtained by application to the Registrar of the School of Physic.

All Degrees and Courses of Instruction are open to women students.

Scholarships and Prizes.—1. Medical and Surgical Travelling Prizes, £100, awarded in alternate years. 2. Bicentenary Memorial Prize, £30, awarded yearly, and given to the Travelling Prizeman. 3. Sir John Banks Prize and Medal. 4. Edward Hallaran Bennett Prize and Medal. 5. FitzPatrick Scholarship, awarded on results of Final Examination (interest on £1000). 6. Medical Scholarship, £20 per annum for two years, awarded in Chemistry, Physics, Botany, and Zoology. 7. Medical Scholarship in Anatomy and Physiology, £20 per annum for two years. 8. Henry Hutchinson Stewart Scholarships, one in Botany, Zoology, Chemistry and Physics, and another in Anatomy and Physiology, awarded annually and valued at £10 per annum for three years. 9. Henry Hutchinson Stewart Scholarship in Mental Diseases, awarded from time to time, £50 per annum for three years. 10. John Mallet Purser Medal, awarded annually in Physiology. 11. Daniel John Cunningham Medal and Prize, awarded annually in Anatomy. 12. Begley Studentship, £40 per annum for four years, awarded annually. 13. Kingsmill Jones Memorial Prize, awarded annually in Natural and Experimental Science, £15. 14. O'Sullivan Memorial Scholarship, £48 awarded annually for excellency of record in school.

Post-graduate Instruction.—Arrangements have been made, with the approval of the Board of Trinity College, for a post-graduate course of instruction at the School of Physic during the autumn from Monday, Sept. 16th, to Saturday, Oct. 5th. A limited number of members of the class can reside in college rooms and dine on commons. Women graduates can be accommodated at Trinity Hall.

HOSPITALS AFFORDING PRACTICE RECOGNISED BY THE IRISH UNIVERSITIES AND CORPORATIONS.[1]

SIR PATRICK DUN'S HOSPITAL, Grand Canal-street, Dublin.—Classes both in Medicine and Surgery are held each morning from 9 o'clock from Oct. 1st till the end of June. Special classes for junior students will be held in the wards during the months of October, November, and December. A Resident Surgeon, with salary, is appointed annually. Six Resident Pupils are appointed every six months. Twelve surgical Dressers and twelve Clinical Clerks are appointed each month. There are facilities for women students.

The practice of the hospital is open to all students, and the certificates are recognised by Dublin University, the National University and Royal Colleges of Surgeons of England, Ireland, and Scotland. It is an official "Treatment Centre" for venereal diseases.

Prizes and Medals.—Clinical medals and prizes amounting to about £21 each will be awarded in Medicine and in Surgery respectively in accordance with the will of the late Rev. Samuel Haughton, M.D., S.F.T.C.D. Candidates who fail to obtain these medals and prizes will be awarded special certificates in Medicine and in Surgery provided they show sufficient merit.

Further information will be supplied by the Hon. Secretary to the Medical Board.

ADELAIDE HOSPITAL, Peter-street, Dublin.—Two resident surgeons are elected half-yearly and four or more resident pupils every six months. At the termination of the session prizes in Clinical Medicine, in Surgery, in Gynæcology, and in Dermatology will be awarded.

Prizes.—Wallace Beatty Memorial bursaries are awarded at the commencement of the winter session. In addition to the junior prizes the Hudson Scholarship, £30 and a gold medal, as well as a prize of £10 together with a silver medal, are awarded at the end of the session for proficiency in medicine, surgery, gynæcology, and pathology.

The certificates of attendance are recognised by all the Universities and licensing bodies in the United Kingdom. Further particulars may be obtained from the Secretary of the Hospital.

MATER MISERICORDIÆ HOSPITAL, Dublin. (Under the care of the Sisters of Mercy.)—This Hospital, containing 410 beds, is open at all hours for the reception of accidents and urgent cases. Clinical instruction is given by the Physicians and Surgeons at 9 A.M. daily. Ophthalmic Surgery is taught in the Special Wards and in the Dispensary. Surgical operations are performed daily. Connected with the

[1] This list of the institutions recognised by the Conjoint Board of Ireland is supplemented in the regulations of the Colleges by those hospitals mentioned as recognised institutions in Scotland and England. The recognised facilities for clinical instruction in some of the Irish centres have been described.

hospital are extensive Dispensaries, which afford valuable opportunities for the study of general Medical and Surgical Diseases, and Accidents; a fully-equipped Biochemical Laboratory, a modern Electro-Massage Department, and Electrocardiograph room. Instruction is given on Pathology and Bacteriology. Three House Physicians, eight House Surgeons, and 18 resident pupils are elected annually. Dressers and Clinical Clerks are appointed regularly and certificates given for merit. Leonard Prizes will be offered for competition annually. Certificates of attendance are recognised by all the Universities and licensing bodies in the United Kingdom. There is a Private Hospital for the reception of Medical and Surgical cases. A Training School and a Home for Trained Nurses are connected with the Hospital, and Nurses who have passed a qualifying examination can be obtained on application to the Lady Superior.

Entries can be made with any of the physicians or surgeons, or with the Registrar, 31, Fitzwilliam-square. Detailed information may be obtained from the Secretary, Medical Board.

MERCER'S HOSPITAL.—This hospital contains 120 beds for medical and surgical cases, and arrangements have been made with the medical officers of Cork-street Fever Hospital whereby all students of this hospital are entitled to attend the clinical instruction of that institution and become eligible for the resident posts. There is a large dispensary for out-patients and a modern X ray department. An electrocardiograph has been installed. Students of the hospital are permitted to attend the gynæcological department, where they receive practical instruction. There are special wards for the treatment and study of children's diseases. A gold medal is awarded annually to the best student. During the past few years the hospital has undergone extensive alterations in order to bring it up to modern requirements. A House Surgeon is appointed annually. There are six men and two women Resident Pupils, and Clinical Clerks and Dressers are appointed from members of the classes.

For further particulars apply to Dr. Leonard Abrahamson, Hon. Sec., Medical Board, 40, Fitzwilliam-place.

RICHMOND, WHITWORTH, AND HARDWICKE HOSPITALS (HOUSE OF INDUSTRY HOSPITALS), DUBLIN.—These hospitals contain 330 beds—130 for Surgical Cases, 80 for Medical Cases, 78 for Fever and other Epidemic Diseases, and an Auxiliary Wing with 42 beds, devoted mainly to throat, nose and ear and skin diseases. Two Resident Physicians and two Resident Surgeons are appointed each half year, in addition to a Resident Pathologist and a Resident Anæsthetist. Resident Clinical Clerks are appointed each quarter, and it has always been the aim of the Medical Board to ensure that each student spends at least six months in residence. Women students are eligible on the same terms as men. Ample facilities exist for post-graduate work in the various special departments, as well as in general medicine and surgery. Extensive alterations and improvements have recently been made in the X ray, Electrotherapeutic, and Electrocardiographic departments. For further information apply to Hon. Sec., Medical Board.

ROYAL CITY OF DUBLIN HOSPITAL.—158 beds and a special wing for the treatment of fevers and contagious diseases founded by the late Mr. Drummond. There is a large nursery where special opportunities are afforded for the study of diseases of children, both medical and surgical. There are also special wards for ophthalmic, aural, and gynæcological cases; also a department for the Erlangen Treatment by Deep Therapy. There is a largely attended out-patient department, where students are allowed to attend accidents and dress cases under supervision. Six resident pupils are appointed every three months. A House Surgeon and a House Physician are appointed annually. For information apply to the Secretary.

DR. STEEVENS' HOSPITAL, Dublin (Kingsbridge).—250 beds, only 150 now in use. There is accommodation for 10 resident pupils, each of whom is provided with a separate bedroom, and board is supplied by the hospital at a reasonable rate. There is an Electric Massage Department, a "Sun-Ray" and Diathermy Department, and an X Ray Department. There are also two V.D. wards and a largely attended V.D. Treatment Centre. All information with regard to the terms for such residency can be had from the Resident Surgeon at the Hospital. Secretary: E. D. F. Banks.

MEATH HOSPITAL AND COUNTY DUBLIN INFIRMARY.*

JERVIS-STREET HOSPITAL, Dublin.*

ROTUNDA HOSPITAL, Dublin.—This institution is the largest combined gynæcological and maternity hospital in the British Empire. Over 4000 confinements are attended annually and upwards of 1000 gynæcological patients admitted. Students can take out their necessary gynæcological and midwifery practical courses. The work of the hospital is carried on continuously through the year, and consists of daily clinical instruction in the maternity department and examination and operations in the gynæcological department. Qualified students are given facilities for studying and assisting in the management of all abnormal cases so far as is practical. An antenatal dispensary is held three times weekly and all students are encouraged to attend. A special class in gynæcological examination and diagnosis is conducted by the Assistants to the Master. In addition there is a special class in operative obstetrics, limited in number. The pathological laboratory is under the supervision of a skilled pathologist, who gives special classes at intervals. There is a fully equipped X ray installation under the care of a competent radiologist. A ward has been opened for the treatment of infantile conditions, and is under the care of a pædiatrician, who gives instruction in the out-patient department, which is held daily. The appointments on the staff of the hospital are given to qualified past students of the hospital who have taken the L.M. and consist of Extern Assistants for six months, one being appointed every three months. From these the Assistants to the Master are appointed. Women students can reside in the hospital on the same terms as men. The mess room and sleeping quarters have been decorated recently and reading rooms are provided. The L.M. is granted by examination after a six months' course. Fees for Intern students: one month £6 6*s*., months other than the first £4 4*s*., three months £12 12*s*., six months £21. Special gynæcological class £2 2*s*. per month. For further particulars apply to the Master, Dr. Bethel Solomons, F.R.C.P.I.

COOMBE LYING-IN HOSPITAL AND GUINNESS DISPENSARY FOR THE TREATMENT OF DISEASES PECULIAR TO WOMEN, Dublin.—This hospital contains 70 beds and consists of two divisions, one of which is devoted to lying-in cases and the other to the treatment of diseases peculiar to women. Lectures are delivered, practical instruction given, and gynæcological operations are performed in the theatres daily. There is a general dispensary held daily, at which instruction is given on the Diseases of Women and Children. There is a special afternoon dispensary held by the Master and his assistants, at which practical instruction in gynæcology is given. There is no extra charge for attendance at this Dispensary. There is accommodation for intern pupils, who enjoy exceptional advantages of acquiring a thorough knowledge of this branch of their profession. Women students can reside in the hospital. Clinical assistants are appointed from amongst the pupils as vacancies occur. Certificates of attendance at this hospital are accepted by all licensing bodies. Students can enter for attendance at any time, but preference is given to those entering from the first day of the month. Further particulars may be had on application to the Master or the Registrar at the Hospital.

* No returns.

NATIONAL MATERNITY HOSPITAL, Holles-street, Dublin.—Established 1894. The hospital consists of Intern and Extern Maternity, Gynæcological Wards, and a Dispensary for the treatment of Diseases of Women and Children and an antenatal and post-natal branch. Every facility is given for the carrying out of practical work. Undergraduate and post-graduate courses are arranged at any time. Certificates of attendance at this hospital are recognised by all the licensing bodies. Clinical lectures are given daily and Oral lectures four times per week. The L.M. Diploma is given by special examination, which is held three times a year. Further particulars can be obtained from P. T. McArdle, Esq., M.B., the Master, or from the Secretary, Holles-street, Dublin.

ST. VINCENT'S HOSPITAL AND DISPENSARY, Dublin. —Established 1834. 200 beds. Clinical Lectures in Medicine and Surgery are held from October to June. Special classes for Juniors from October to December. Pathological and Bacteriological Demonstrations are given every Thursday, and instructions in the use of Laryngoscope and Otoscope for senior students every Saturday. Medals and Prizes: the Bellingham gold medal in Medicine and the O'Ferrall gold medal in Surgery are offered for competition at the end of the summer session, as well as junior prizes, also the McArdle Memorial Prize, value £20. There are a large Extern Department and a new Pathological Laboratory. Hon. Secretary Medical Board, Wm. Doolin, M.B., F.R.C.S., 2, Fitzwilliam-square, Dublin.

NATIONAL UNIVERSITY OF IRELAND.

Matriculation.—All students must pass a matriculation examination; the examination taking place in June and September in Dublin, and at certain local centres, includes five subjects, three of which must be Irish, English, and mathematics. All students must pass in Irish except students not born in Ireland, and other students whose home residence shall have been outside Ireland during the three years immediately preceding their matriculation; but all such students will be expected to attend a course of instruction in Irish Literature and History prior to obtaining any degree in the University. The following are the subjects for examination:—(1) Irish. (2) Latin. (3) Greek. (4) French. (5) German. (6) Italian. (7) Spanish. (8) Portuguese. (9) Welsh, or any other modern language approved by the Senate. (10) English. (11) Mathematics. (12) History. (13) Geography. (14) Applied Mathematics, or (15) Physics as an alternative. (16) Chemistry. (17) Botany. (18) Agricultural Science. (19) Commerce. (20) Music, and for women candidates only (21) Physiology and Hygiene. Students entering for degrees in Medicine or Dentistry, if not already registered by the General Medical Council, must take Irish, Latin, English, Mathematics, and a fifth subject.

The medical degrees granted are:—

M.B., B.Ch., B.A.O.; M.D., M.Ch., M.A.O., Ph.D.—Printed forms of application for admission to any medical examination may be had from "The Registrar, The National University of Ireland, Dublin."

The Constituent Colleges of the National University of Ireland at which the full curriculum for medical degrees can be obtained are University College, Dublin; University College, Cork; and University College, Galway.

UNIVERSITY COLLEGE, DUBLIN.—*Matriculation.*—Almost all the students of the College are matriculated students of the National University of Ireland. The pre-registration examination in physics and chemistry is taken after matriculation either at the beginning of or during the winter session. The course is of five years' duration and dates from the passing of the pre-registration examination.

Degrees of M.B., B.Ch., and B.A.O.—The First Examination includes Applied Physics, Applied Chemistry, Botany, Zoology, and Applied Biology. The examination may be taken in two parts: Part I., Physics and Chemistry; Part II., Botany and Zoology. Honours may be obtained only when both parts are taken as one examination. The Second Examination includes Anatomy and Physiology. Both must be passed at the same time. The Third Examination (Part I.) includes Pathology, Materia Medica, Pharmacology, and Therapeutics. Part II. (Third Examination), taken at the end of the Fourth Winter Session, includes Hygiene and Medical Jurisprudence.

The Final Examination in Medicine, Midwifery, Surgery, and Ophthalmology includes both the theoretical and the clinical branches. No student can enter for the M.B., B.Ch., or B.A.O. until the end of the fifth year after registration, when the curriculum has been completed. The degree of M.D. may be obtained either by examination or on published work.

A Post-graduate Summer Course is held each year, beginning about the middle of June. The D.P.H. Course extends over the year, beginning at the opening of the session.

UNIVERSITY COLLEGE, CORK: THE SCHOOL OF MEDICINE.—Students must have passed the Matriculation Examination of the University or some other recognised examination, and a preliminary examination recognised by the General Medical Council.

Medical Students who have passed the First Professional Examination of the Conjoint Boards of Ireland, England, or Scotland may be admitted to the rank of second-year students on making application to the Council. Similarly, students who have passed the Second Professional Examination of the same Boards may be admitted to the rank of third-year students; and those who have passed the Third Professional Examination of the Dublin Colleges, or of the Edinburgh Colleges and Glasgow Faculties, may rank as fourth-year.

The school is provided with physiological, toxicological, pathological, and pharmaceutical laboratories, materia medica, anatomical and pathological museums, as well as a collection of surgical and obstetrical instruments and appliances. There are dissecting-rooms, well-appointed physical, chemical, and biological laboratories, a large natural history museum in the adjoining building, and part of the College ground is laid out as a botanical garden. The plant houses are well filled with plants and are open to the students in the class of Botany. The Library contains about 70,000 volumes and is open daily during term time to students. The Medical Museum occupies a large room erected at the northern end of the medical buildings. There are Students' Clubs for men and women students of the College and various athletic clubs.

Residence of Students.—Students not living at home, or with relatives or friends, sanctioned by their parents or guardians, are required to live in a hostel or in recognised lodgings, and register their addresses each session. The Honan Hostel, adjoining the College, is equipped by private endowment. A number of sets of rooms, together with recreation and common rooms, are provided for lay students who may desire to live there. For full particulars apply to the Warden. The Ursuline Convent, Blackrock, has a house of residence, quite separate from their Secondary School, for Catholic women students.

Clinical Instruction.—Students may attend the South Charitable Infirmary and County of Cork General Hospital, Cork North Charitable Infirmary and City of Cork General Hospital, the Mercy Hospital, the Cork District Lunatic Asylum, the Victoria Hospital for Diseases of Women and Children, the County Lying-in Hospital, Bon Secours, Fever, the District, and Ear, Eye, and Throat Hospitals.

Complete information with regard to class fees, scholarships, and prizes can be obtained from the Dean of the Medical Faculty, and in respect of the hospitals from the Secretaries.

UNIVERSITY COLLEGE, GALWAY: SCHOOL OF MEDICINE.—The College contains a well-lighted and ventilated dissecting-room and an anatomical lecture theatre; physiological, pathological, pharmaceutical, chemical, and physical laboratories; anatomical, pathological, gynæcological, and materia medica museums; as well as large natural history and geological museums and an extensive library in which students can read and from which they can borrow books. There are 12 Entrance Scholarships, varying in value from £30 to £60 each, for which Medical Students compete with other students on the Entrance Course. In the Second, Third, and Fourth years three Scholarships in each year, value from £30 to £40 each, are reserved for Medical Students. H. H. Stewart Scholarships (£10 a year for three years) are awarded by the University in Anatomy and Physiology at Second Medical Examination amongst Students of the three constituent Colleges. Travelling Studentships (£200 a year for two years) are offered by the University for competition amongst Medical Graduates of the three Colleges of not more than two years' standing. Women students are eligible for all College and University Degrees, Distinctions, and Prizes. There are extensive grounds, a portion of which is occupied by a Botanic Garden and a portion is at the disposal of the College Athletic Union. There are several student societies in the College, including a Biological Society. There are abundant facilities for research and Post-graduate work in the Chemistry, Physiology, and Pathology departments. There are ample facilities for Women Students. Further information can be obtained from the Registrar of the College.

Clinical Instruction is given in the Galway Tuberculosis Hospital and in the Galway Central and Fever Hospitals, containing on an average 350 patients.

CENTRAL HOSPITAL, GALWAY (300 beds).—In this completely renovated hospital, in addition to the Finer Surgical and Medical Departments, there are now Eye and Ear, Throat and Nose, Gynæcological and Obstetrical, Pathological, X Ray, Ultra-Violet Rays, and Electrical and Massage Departments. Students attend from University College, Galway. Medical and Surgical Clinics are held on alternate days during term. One Resident Physician and one Resident Surgeon are appointed every six months. Resident Students are admitted. The hospital is open to qualified medical men for post-graduate work.

QUEEN'S UNIVERSITY OF BELFAST.

There are six degrees in the Faculty of Medicine of the University—viz., Bachelor of Medicine (M.B.), Bachelor of Surgery (B.Ch.), Bachelor of Obstetrics (B.A.O.), Doctor of Medicine (M.D.), Master of Surgery (M.Ch.), and Master of Obstetrics (M.A.O.). The University also grants a Diploma in Public Health, particulars of which will be found in the University Calendar. The degrees of M.B., B.Ch., and B.A.O. are the primary degrees in the Faculty of Medicine, and are conferred at the same time and after the same course of study. No student is admitted to the final examination for these degrees until he has shown: (1) that he is a matriculated student of the University; (2) that he has completed the prescribed course of study in the Faculty of Medicine extending over a period of not less than five academic years from the date of his registration as a student of Medicine; (3) that he has passed the several examinations prescribed; (4) that he has attended in the University during three academic years at least the courses of study prescribed for such degrees (the Senate may accept, for not more than two academic years of the required five, courses of study pursued in any other University or School of Medicine approved by the Senate); and (5) that he has attained the age of 21 years. Every candidate for admission shall matriculate or fulfil such other test of fitness as may be prescribed by the Senate, or may be exempted from the matriculation examination by having passed similar examinations elsewhere. For information as to Scholarships and Prizes, inquiry should be made of the Secretary of the University.

Primary Degrees of M.B., B.Ch., B.A.O.—All candidates for these degrees must satisfy the examiners in the subjects of four examinations.

The First Medical Examination.—The subjects of this examination are Chemistry (Inorganic and Organic), Experimental Physics, Botany and Zoology. The examination will be divided into two parts which may be taken separately: I., Chemistry and Physics; II., Botany and Zoology.

The Second Medical Examination.—The subjects are Anatomy and Practical Anatomy, Physiology and Practical Physiology. Candidates who have previously passed the First Medical Examination may present themselves for this examination at the close of their second year.

The Third Medical Examination.—The subjects are: (1) Pathology and Practical Pathology; (2) Materia Medica, Pharmacology and Therapeutics; (3) Medical Jurisprudence; (4) Hygiene. Candidates who have previously passed the Second Medical Examination may present themselves for this examination at the close of the third year. Attendance on a course in any subject of the Third Medical Examination shall not entitle a student to a certificate of attendance unless he has previously passed in all the subjects of the Second Medical Examination.

The Fourth Medical Examination.—The subjects are: (1) Medicine; (2) Surgery; (3) Midwifery; (4) Ophthalmology and Otology. This examination may be taken in two parts: I., Systematic; II., Clinical, Practical and Oral. Candidates who have previously passed the Third Examination may present themselves for Part I. of the Fourth Examination at the close of the fourth year, provided that they have fulfilled the necessary requirements as to attendance, &c., on the courses of instruction in the subjects of examination. Candidates who have passed Part I. of this examination may present themselves for Part II. at the close of the fifth year, provided that they have fulfilled the necessary requirements as to hospital attendance on the various clinical courses in the subjects of examination. Parts I. and II. may be taken together at the close of the fifth year. Attendance on a course in any subject of the Fourth Medical Examination shall not entitle a student to a certificate of attendance unless he has passed in the subjects of the Second Medical Examination.

Degrees of M.D., M.Ch., and M.A.O.—These degrees are not conferred until the expiration of at least three academic years, or in the case of graduates of the University in Arts or Science of at least two academic years, after admission to the primary degrees in the Faculty of Medicine. Every candidate must show that in the interval he has pursued such courses of study, or been engaged in such practical work as may be prescribed. These degrees may be conferred by the Senate either (*a*) after an examination, which includes written, oral, clinical, and practical examinations; or (*b*) on the submission of a thesis or other evidence of original study or research, to be approved by the Faculty of Medicine after an oral or other examination of the candidate on the subject.

The Medical School.—The Donald Currie Chemical Buildings contain a lecture theatre, a preparation room, a chemical museum, a large class-room for elementary practical chemistry, laboratories for qualitative and quantitative analysis, rooms for water and gas analysis, dark room for photographic purposes and balance room, provided with all modern appliances. The Anatomical Department contains a large and well-lighted dissecting-room, a lecture-room, a professor's and demonstrator's room, a bone-room, and a laboratory for microscopic and photographic work. The Medical Museum is in the same building. The Jaffé Laboratories for Physiology comprise a

lecture theatre, laboratories for practical work in chemical physiology, histology, and experimental physiology, and in addition small private research rooms, including balance, galvanometer, and centrifuge rooms. The J. C. White laboratories, recently founded, are fully equipped for research in biochemistry and bacteriology. The Musgrave Pathological Laboratory.—In this department opportunity is afforded for research in pathology and bacteriology. The department is in touch with most of the hospitals in Belfast, and there is an ample supply of material for investigation by graduates in morbid histology, clinical pathology, and the bacteriology of infectious diseases. A course in pathology or bacteriology is given to graduates, and members of this class have an opportunity of seeing the methods employed in the various investigations carried out in the department for the Public Health Committee of the Corporation in connexion with water-supply, sewage disposal, meat- and milk-supply, and the diagnosis of cases of infectious diseases. The certificate issued to members of the class in bacteriology qualifies for the D.P.H. degree. The Pharmaceutical Laboratory is fitted and equipped for the work of practically instructing students in the compounding and dispensing of medicines.

Clinical Instruction.—The following institutions are recognised by the University as affording proper opportunities for clinical instruction: the Royal Victoria Hospital, the Mater Infirmorum Hospital, the Union Hospitals, the Belfast Hospital for Sick Children, the Belfast Maternity, the Ulster Hospital for Women and Children, the Ulster Eye, Ear, and Throat Hospital, the Belfast Ophthalmic Hospital, the Purdysburn Fever Hospital, and the Belfast District Lunatic Asylum. Complete information can be obtained from the respective Secretaries.

ROYAL VICTORIA HOSPITAL, Belfast, 436 beds.—Students eligible for McGrath, McQuitty, Malcolm, Coulter Smyth and Elwood Scholarships aggregate annual value £185. Twelve House Surgeons and House Physicians. Thirty-six resident pupilships, three months each, annually for Senior Students, of which a proportion is allotted to Women Students, Special Departments for Radiology, Clinical Pathology, V.D., Dermatology, Gynæcology, Vaccine Therapy, Electrocardiography, Dentistry, Radium Therapy.

MATER INFIRMORUM HOSPITAL, Belfast.—This hospital contains 270 beds and is open at all hours for the reception of accidents and urgent cases. Clinical instruction is given daily by Physicians and Surgeons. Surgical operations are performed daily. The out-patient departments in Medicine and Surgery, also the special dispensaries for Gynæcology, Ear, Eye and Throat, Electrotherapeutics, Venereal Diseases are very largely attended and afford valuable opportunities to students for the study of those subjects. A House Physician and two House Surgeons are elected every six months. Resident pupils are admitted as the vacancies arise. Three Exhibitions and a Gold Medal are competed for annually in June. Certificates of attendance upon this hospital are recognised by all the Universities and licensing bodies in the United Kingdom.

BELFAST INFIRMARY AND HOSPITAL (1600 beds).—Clinical courses are given quarterly, and a course for D.P.H. in Hospital. Intern Venereal Clinic in Infirmary under Corporation scheme. Maternity Hospital recognised for Practical Midwifery training. Particulars may be obtained on application to the Hon. Sec. Visiting Medical Staff. Certificate of vaccination class recognised by Local Government Board. There is a department for Cancer with 32 beds, and X Ray and Bacteriological Departments.

THE BELFAST HOSPITAL FOR SICK CHILDREN, Queen-street (45 beds).—Clinical instruction is given in this hospital. During the Winter Session two Courses of Lectures are delivered on the Medical and Surgical Diseases incidental to Infancy and Childhood. Demonstrations in Ophthalmology and Pathology are given, and ample opportunities are afforded in the wards and in the Out-patient Department for gaining a practical and theoretical knowledge of the diseases of Infancy and Childhood. This Hospital grants Certificates in Diseases of Children, which are recognised by the various Examining Bodies. Certificates are also granted for post-graduate study. A Gold Medal is offered for competition at the close of the session.

MATERNITY HOSPITAL, Townsend-street, Belfast.—Twenty-five beds in constant occupation, and exclusively devoted to Midwifery and Antenatal conditions. There is also a large district. The Queen's University of Belfast have erected a Students' Hostel in connexion with the Hospital where six Students and Post-graduates are received each month. The University Tutor in Obstetrics resides in the Hostel and Students conduct their cases under his supervision. There is a large Antenatal Department and a Department for Venereal Diseases. Communications should be made to the Hon. Secretary of the Medical Staff.

ULSTER HOSPITAL FOR CHILDREN AND WOMEN, Templemore-avenue, Belfast (58 beds).—Clinical instruction to students in Diseases of Children, Gynæcology and Obstetrics. Special departments: Radiology and Actinotherapy, Eye, Ear, and Throat, V.D. Clinic and Antenatal Clinic. Gold Medal awarded annually. Two House Surgeons appointed from students of hospital.

BENN ULSTER EYE, EAR AND THROAT HOSPITAL, Clifton-street (30 beds), and BELFAST OPHTHALMIC HOSPITAL, Great Victoria-street (30 beds).—Practical demonstrations by the staff and occasional clinical lectures in the subjects of Ophthalmology, Otology, and Laryngology. Clinical instruction is given daily.

BELFAST FEVER HOSPITALS.—City Fever Hospital, Purdysburn (360 beds); Union Fever Hospital (200 beds). Clinical Classes are held during the winter and summer sessions. Post-graduate (D.P.H.) Classes are also held. Dr. A. Gardner Robb, Lecturer and Medical Superintendent.

BELFAST MENTAL HOSPITAL (PURDYSBURN VILLA COLONY) (1300 beds). University Lectures and Clinics.

IRISH MEDICAL CORPORATIONS GRANTING DIPLOMAS.

ROYAL COLLEGE OF PHYSICIANS OF IRELAND AND ROYAL COLLEGE OF SURGEONS IN IRELAND.

The Irish Conjoint Board requires of candidates the passage either of its own preliminary examination in the subjects of general education or proof that the candidate has passed one of the tests accepted by the General Medical Council as well as passing in the Pre-Registration Examinations in Chemistry and Physics and Biology.

Professional Examinations.—There are three professional examinations, the first of which cannot be passed earlier than the end of the second winter session, nor the final before the conclusion of full five years of medical study. Before being admitted to any of them the candidate must show that he has studied the different subjects in practice and theory for the requisite periods, certificates to this effect being accepted from the authorities of most of the recognised medical schools at home and abroad. The first examination deals with (*a*) Anatomy, and (*b*) Physiology and Histology. The second examination deals with (*a*) Pathology, (*b*) Materia Medica, Pharmacy, and Therapeutics and Ophthalmology, and may be taken separately.

Final Examination.—This is divided into three divisions, which cannot be completed until at least five years have passed in medical studies other than those for the Pre-Registration Examinations, and five years at least since the beginning of the curriculum. The divisions are (*a*) Medicine, including Fevers, Mental Diseases, and Diseases of Children; (*b*) Surgery, including Operative Surgery; (*c*) Midwifery, including Diseases of Women and Children, and the Practice of Vaccination.

Diploma in Psychological Medicine.—There are two examinations in connexion with this Diploma: Part I. consists of (*a*) Anatomy and Physiology of the Nervous System; (*b*) Psychology. Part II.: (*a*) Neurology, including Clinical and Pathological Neurology; (*b*) Psychological Medicine, including its legal relationships.

Further information can be obtained from the Secretary of the Committee of Management, Royal College of Surgeons, St. Stephen's Green.

ROYAL COLLEGE OF PHYSICIANS OF IRELAND.

The College issues its Licences in Medicine and in Midwifery to practitioners whose names appear on the Medical Register of the United Kingdom.

The Licence in Medicine.—The subjects of examination are: Practice of Medicine, Clinical Medicine, Pathology, Medical Jurisprudence, Midwifery, Hygiene, and Therapeutics.

The Licence in Midwifery.—Candidates must produce certificates of registration. A registered medical practitioner of five years' standing may be exempted from the examination by printed questions.

The Membership.—Examinations for Membership are held in February, June, and November.

The Fellowship.—Fellows are elected by ballot. Applicants must have been a Member of the College for at least one year and must have attained the age of 27 years.

Further particulars can be obtained from the Registrar of the Royal College of Physicians of Ireland, 6, Kildare-street, Dublin.

ROYAL COLLEGE OF SURGEONS IN IRELAND.

The College issues its Licence in Surgery to practitioners whose names are entered either on the Medical Register for the United Kingdom, the Colonial Medical Register, or the Foreign Medical Register of the year in which he presents himself for examination, and who satisfies the Council that he has passed through a course of study and Examinations equivalent to those required by the Regulations of the Irish Conjoint Board.

Candidates are examined in General Surgery (paper and oral), Clinical Surgery, Surgical Pathology (oral), Operative Surgery, Surgical Anatomy (paper), and Ophthalmic and Aural Surgery (clinical).

Diploma in Midwifery.—A diploma in Midwifery is granted after examination to persons possessing a registrable qualification.

Fellowship Examinations.—Candidates for the Fellowship shall make application to the President and Council to be admitted to examination. They are required to pass two examinations—Primary and Final. Candidates may present themselves for the Final Examination immediately after passing the Primary part, provided they have complied with the necessary regulations. The subjects for the Primary Examination are (*a*) Anatomy, including Dissections; and (*b*) Physiology and Histology. The subjects for the Final Examination are Surgery, including Surgical Anatomy and Pathology. For admission to the Final Examination the candidate must have passed the Primary Examination, and must be a Licentiate or Graduate in Surgery of a university or licensing body recognised by the General Medical Council; all such candidates must not be less than 25 years of age.

Further particulars can be obtained from the Registrar of the College, Stephen's-green West, Dublin.

ROYAL COLLEGE OF SURGEONS IN IRELAND (SCHOOLS OF SURGERY).—The schools of surgery are attached by Charter to the Royal College of Surgeons and have existed as a department of the College for over a century. They are carried on within the College buildings and are specially subject to the supervision and control of the Council, who are empowered to appoint and remove the professors and to regulate the methods of teaching pursued. The buildings have been reconstructed, the capacity of the dissecting-room nearly trebled, and special pathological, bacteriological, public health, and pharmaceutical laboratories fitted with the most approved appliances in order that students may have the advantage of the most modern methods of instruction. The entire building is heated by hot-water pipes and lighted throughout by the electric light. Winter Session commences in October; Summer Session in April. Scholarships and Prizes; Carmichael Scholarship, £15; Mayne Scholarship, £8: Stoney Memorial gold medal; Operative Surgery, gold and silver medals; Pierefoy Memorial Prize, value £150; Barker Prize, £26 5*s.*; H. Macnaughton-Jones gold medal in Obstetrics and Gynæcology; and class prizes and medals. Prospectuses and guide for medical students can be obtained post free on written application to the Registrar, Royal College of Surgeons, Stephen's-green W., Dublin.

APOTHECARIES' HALL OF IRELAND.

The Licence of this Hall is granted to students who present certificates of having fully completed the course of study as laid down in the curriculum and who pass the necessary examinations. The diploma of the Hall entitles the holder to be registered as a practitioner in medicine, surgery, and midwifery, with also the privileges of the Apothecary's Licence.

Candidates must pass two Professional Examinations, called the Primary Examination and the Final Examination, which are conducted at separate times, partly in writing, and partly practically and orally. The Primary and Final Professional Examinations are held twice a year—viz., in June and November, or such other dates as may be determined.

Candidates who produce satisfactory evidence of having passed an examination for a Degree or Licence in Medicine, conducted by any University or Royal College in the British Empire, or by any Foreign University whose Degrees are recognised in the Foreign List of the Medical Register, will be exempted from the Primary Examination.

The subjects for Part I. of the Primary Examination are: Anatomy, Physiology and Histology, including Bio-Chemistry; and for Part II., Materia Medica and Pharmacy, Pathology, and Medical Jurisprudence and Hygiene.

For the Final Examination the subjects are: (*a*) Medicine and Clinical Medicine and Clinical Methods. (*b*) Surgery—Clinical, Ophthalmic and Operative; and Surgical Anatomy. (*c*) Midwifery and Gynæcology, and Practical Pharmacy and Materia Medica (if not taken at Intermediate Examination).

Each candidate before receiving his diploma must produce evidence that he has attained the age of 21 years. The details of the course of education required and syllabus of the examinations will be supplied by the Registrar at 95, Merrion-square, Dublin.

WE take this opportunity of thanking the officials of Government Departments and the Deans and Secretaries of the various institutions for their kind coöperation in enabling us to bring the information contained in our Students' Number up to date.

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THE LANCET.

LONDON: SATURDAY, AUGUST 31, 1929.

PHYSIOLOGY AND THE MEDICAL CURRICULUM.

In an issue devoted to considering the training of those who are entering the medical profession, while the main information will bear relation to the curriculum which they have to follow, some reflections upon the general circumstances of the medical career are pertinent. During the year that has passed since the last issue of the Students' Number the calling of medicine has been in no way seriously altered either in relation to the training of students or in relation to their future professional prospects. The medical curriculum has been unaltered since its inter-arrangement last year following the resolution of the General Medical Council passed some seven years ago; the overcrowded schedules of study have been somewhat eased by the introduction of order, while the spirit shown by the licensing bodies when various details were under discussion is of good omen for future changes. And changes there must be both in the academic and the practical equipment of doctors in sympathy with the growth of professional knowledge, and with the increasing intimacy between medicine in particular and science in general. The professional opportunities remain as good and as numerous as heretofor, but the difficulties of the medical career cannot be said to have abated in any marked way. And it is gratifying to be able to say that the opportunities, because of their vast implications, outweigh the disadvantages. It is with the full knowledge that the life of the doctor is a finer career than ever, because of the far-reaching and well-supported promises of good which the development of medicine are giving, that we welcome into our ranks the recruits who will take their places next October in the schools.

The anticipation that the studies preliminary to a medical course, as well as those directly connected with that course may always need variation is justified by the proceedings before the Section of Physiology and Biochemistry of the British Medical Association which we publish in another column. Prof. F. R. Fraser, in opening a discussion on the place which human physiology should occupy in the training of medical students, spoke exactly words which ought to be appreciated alike by the medical profession and the public that it serves, and indicated an aspect of medical teaching whose importance will be seen readily. He pointed out that human physiology must largely concern itself with the interaction of systems, and that knowledge of it means comprehension of human adjustments to environment, the great responsibility of medicine being to ascertain the causes of maladjustments, in order to remove or mitigate results. This view of the study of physiology introduces the question of how much should be taught to the medical student and at what place in his curriculum. All will agree that human physiology should be taught to the students before admission to the wards, but how much of what may be termed the science of living is it possible to impart while formal instruction is still being given in the processes of, say, the respiration and the circulation? The more the student has a chance of enlarging his knowledge of normal man before being introduced to the abnormalities of injury and disease, the easier will it be for him to appreciate human adjustments, and therefore to follow with intelligence the teaching of the clinicians who are his preceptors in the wards. Says Sir George Newman, in his Annual Report for the Year 1928, as Chief Medical Officer of the Ministry of Health, which has just appeared (see p. 480): "There must be a standard in our minds, and that standard should not be one of disease or pestilence, but of health and physiology. It is true there is no fixed line of health for a nation any more than for an individual. But we must formulate an average, a norm, as best we may, establishing it on physiological facts. . . . Out of our rapidly extending knowledge of physiology and anthropometry we must build up a normal conception of body size, weight, and height, body temperature, the pulse-rate, blood pressure, the respiration-rate, lung capacity and chest expansion, muscle output, nerve efficiency, sense faculty, and mental tests. We must aim to bring the race, by means of the individual, steadily towards this standard." In these words we have a fine confirmation of Dr. Fraser's thesis, and, further, an eloquent plea for an altered attitude towards the training of medical students in human physiology. And evidence in the same direction is contained in the pithy notes of Dr. G. F. Walker, of Leeds, who writes in another column (see p. 481) out of his experience as medical tutor at the University. That changes in the indicated direction have already been made quietly and with success in certain schools shows that we have here no drastic measure of reform to clamour for, but only such an inter-arrangement of work as has already taken place along many other lines.

And the influence of such a modified curriculum should have wide-reaching effect. Human physiology is to-day becoming a study of real public interest, while in State, private, and public schools alike it is now felt that a knowledge of the fundamentals of biology should be in the possession of all. It is easy to see that with a public thus growing up to familiarity with normal standards, the doctor will find it far easier to obtain a comprehension of his efforts, of his difficulties, and, perhaps, of his successes when dealing with the variations of and divagations from the normal which constitute disease. But it is necessary, for his counsel to have prompt appeal, that he himself should understand the normal circumstances from which a default has occurred. Undoubtedly the plea made in the Section of Physiology and Biochemistry that more attention should be paid to the normal in the earlier stages of medical education is a forcible one. When this happens and when at the same time the public, in accordance with a routine upbringing, acquire also a knowledge of normal biology, a great deal of unnecessary dissension between the medical profession and the public will be abated, a quickening of public interest in the organisation of our calling will follow, and we shall witness more prompt manifestations of willingness on the part of the public authorities to use medical service intelligently.

The Medical Services.

ROYAL NAVAL MEDICAL SERVICE.

Choosing a Career.

THERE always have been, there are now, and there always will be a certain number of young medical men to whom life in the Royal Navy appeals more than does any other life of a medical man. The type referred to is the man who may have been brought up in Naval surroundings, he may have Naval relations, or he may just love the sea. To a man of this temperament a career as a Medical Officer in the Royal Navy offers very definite attractions. In these days his professional knowledge will most certainly not rust anywhere; but especially in the Naval Hospitals will he have opportunities of practising every branch of his profession, except, of course, diseases of women. He can obtain one of the 60 paid specialist appointments. These include medicine, surgery, diseases of the eyes, diseases of nose, ear and throat, radiology, anæthetics, genito-urinary and venereal diseases, physical training, bacteriology, pathology, and hygiene. He will be encouraged to work hard and play hard. He will see the world under ideal conditions, because wherever he goes he will be a welcome guest, as is always the case with those who are privileged to wear the King's uniform.

In any walk in life success and happiness depend primarily on two main conditions. You must like your fellow men and they must like you.

The right type of man for a Naval Medical Officer is a good doctor, keen on his work and keen on his play, unselfish and a gentleman.

If the doctor is of this type he is invariably everybody's friend. The Naval Officer and the blue-jacket are quick to recognise a Medical Officer who is keen on his work, thoughtful of his patients, and one who strives after improving the health of the Navy. Such a Medical Officer finds life agreeable as everyone is ready to befriend him, and nowhere can one find more delightful friends than in the Navy.

To help men to take higher qualifications opportunities are given, when the exigencies of the Service will permit, for medical officers to take post-graduate courses prior to sitting for these higher examinations. A large number of Naval Medical Officers since joining the Navy have taken qualifications such as M.D., F.R.C.S., M.R.C.P., D.P.H., D.T.M., and D.O.M.S., &c. It is recognised that this is good for the Navy and good for the officer himself.

Work of the Naval Medical Service.

In our large Naval Hospitals the medical, surgical, and specialist work is of a very high standard. The work is very exacting, and it is the aim of the Admiralty to arrange appointments a far as possible so that medical officers have an opportunity of alternating their work, not only at home and abroad, but also ashore and afloat.

To give Naval Surgeons opportunities for professional work has always been a very definite policy of the Admiralty, and within the last year or so this matter has received still further attention.

The General and Specialist Courses have been increased so that, as far as possible, every officer shall have a course of instruction of not less than four months' duration every four years. The number of specialists allowed is now 60 instead of 46 and the specialist allowance is 5s. a day instead of half-a-crown a day. The establishment of Surgeon-Captains has been increased from 16 to 20.

The total number of Medical Officers in the Navy is about 400, and every recent improvement has been made towards giving increased opportunities of advancement and accelerated promotion to the best men.

The advantages of a career with its period of strenuous clinical work, followed by a period of comparative leisure which can be devoted to study, &c., are laid stress on in the Presidential Address of the War Section of the Royal Society of Medicine delivered on Oct. 10th, 1927.

The work and professional opportunities of the Service Medical Officer are described, but the address is necessarily brief, and it is only by reading between the lines that one can really visualise the field for work which lies before the keen Naval Doctor.

Not only has he this purely medical work to interest him. He has opportunities to emulate some of the great Naval Surgeons of the past such as Darwin, Huxley, and many others, who have contributed so much to science.

Play in the Navy.

Recreation is a vital part of the Navy, and there is no branch of athletics or field sports in which the Naval Officer does not have an opportunity of trying his hand. Not only is the champion encouraged but also the less proficient.

In every home port and on most foreign stations there are opportunities for football, cricket, tennis, golf, rowing, sailing, swimming, and all other sports. On some foreign stations the Naval Officer can get shooting and riding in plenty, and so cheap that he can indulge in them on his pay alone. In civil life at home only a rich man could get such magnificent shooting as the Naval Officer does is some parts of the world.

Pay.

The cost of living in the Navy is cheap, and an officer can live on his pay and enjoy life if he is not extravagant, especially if he does not embark in matrimony too early. A small amount of private means goes much further in the Navy than in civil life. The three vital points—pay, prospects, and promotion—of the naval medical officer can be grasped by referring to the following clear and brief table.

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Surgeon Lieutenant-Commander (promoted after six years' service)	„ 600	to 636	„
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Surgeon Captain (promoted by selection)	„ 1116	to 1372	„
Surgeon Rear-Admiral (promoted by selection)	1800		
Medical Director-General (Surgeon Vice-Admiral)	2350		

Allowances.

An outfit allowance of £50 towards cost of uniform is given.

Allowances when in charge of hospitals and sick-quarters	10*s.* and 5*s.* per diem.
Sixty Specialist allowances of	5*s.* per diem.
Allowances to Senior Medical Officers in flag ships	5*s.* and 2*s.* 6*d.* per diem.

Accelerated promotion can be gained under certain conditions; provision allowance and lodging allowance are paid when victualling and accommodation are not provided. Servants allowance is also payable in certain appointments.

The extra allowances alluded to in this table are not to be looked upon as very exceptional. About a quarter of the Medical Officers of the Navy are drawing extra allowances.

Pension.

Finally as regards pensions, is there any man in practice, panel or otherwise, who can say to himself with certainty, "I shall retire at the age of 50 with a life-long pension of £564 per annum for myself, and a pension for my wife should she survive me"? Obviously there are very few. Remember, too, that at the age of 50 a medical man is still young and full of work, and after some of the various specialist appointments he may have held in the Navy, he will be able to hold his own with his confrères on shore and start anew in any of the big centres of the country. His assured income helps him to carry on until his practice is established.

Pension.	Maximum retired pay.
Surgeon Vice-Admiral ..	£1123 per annum, on vacating office.
Surgeon Rear-Admiral ..	£950 per annum, at age of 60.
Surgeon Captain	£846 ,, ,, 55.
Surgeon Commander	£564 ,, ,, 50.
Surgeon Lieutenant-Commander and Surgeon Lieutenant	£423 ,, ,, 45.

Officers permitted to withdraw receive gratuities on the following scale :—

	£
After 4 years' full pay permanent service ..	500
,, 8 ,, ,, ,, ,, ..	1000
,, 12 ,, ,, ,, ,, ..	1500
,, 18 ,, ,, ,, ,, ..	2250

Of recent years Medical Officers have been admitted into the Navy without entrance examination, and for short service, with the option of turning over to the permanent service, but it is anticipated that it will not be long before the Admiralty will revert to the old established system of entrance by competitive examination twice a year, in batches of about ten officers.

The Medical Director-General of the Navy, Queen Anne's Chambers, Tothill-street, London, S.W.1. would be glad to receive inquiries from prospective candidates.

Dental Branch.

The Naval Dental Service offers similar opportunities to qualified dental surgeons except that higher rank than that of the recently instituted Surgeon Captain (D) is not open to them. They are provided with suitable surgery accommodation equipped with modern appliances and supplied with all material required for their work, and there is every opportunity for them to maintain a high standard of professional skill.

Candidates are required to produce certificates of birth, registration, and of character, and must be physically fit for active service anywhere. An outfit allowance of £50 is payable to officers finally entered and commissioned. The rank of Surgeon Lieutenant-Commander (D) is attained on the completion of six years' satisfactory service. Promotions to Surgeon Commander (D) and Surgeon Captain (D) are made strictly by selection from the rank next below and are confined to officers who prove fitted in every respect for these ranks. The present establishment of dental officers is : 1 Surgeon Captain (D), 3 Surgeon Commanders (D), 60 Surgeon Lieutenant-Commanders (D) and Surgeon Lieutenants (D).

Provision has been made for candidates who, at the time of passing the examination, hold or are about to hold an appointment as Dental Officer in a recognised Civil Hospital. The time concerned, provided it does not exceed six months, may reckon for increase of full pay while on the active list. Surgeon Lieutenant-Commanders (D) of over two years' seniority will be eligible for a three months' Post-graduate Course while borne on full pay.

On the completion of two years' service in the rank of Surgeon Lieutenant-Commander (D), dental officers on the Active List are eligible for a three months' post-graduate course at a dental hospital and school at the public expense, and will draw full pay while attending the course.

Pay.—The current rates of full pay for Dental Officers are as follows :—

	£	£
Surgeon Lieutenant (D)		377–462
Surgeon Lieutenant-Commander (D) (promoted after six years' service)		556–687
Surgeon Commander (D) (promoted by selection to fill vacancies in Establishment)		730–933
Surgeon Captain (D) (promoted by selection to fill vacancy in Establishment).. ..		1073–1329

The Regulations regarding Pension and Withdrawal Gratuities are the same as for Medical Officers in the corresponding Ranks.

As in the case of the medical branch, 20 per cent. of the rates of full pay, unemployed pay, half pay, and retired pay introduced in 1919 is considered as due to the high cost of living in 1919 and subject to change periodically either upwards or downwards according as the cost of living rises or falls. The first revision took place in July, 1924, when all the rates were reduced by approximately 5½ per cent., the second revision took place in July, 1927, when all rates were reduced by ½ per cent., and further revisions are due every three years—i.e., in July, 1930, and so on.

ARMY MEDICAL SERVICE.

Royal Army Medical Corps.

The publication of the Royal Warrant of 1926 has removed many of the grievances of officers of the Corps, and this Service can again be recommended as a career to young medical men. Competitive examinations for regular commission, which have been in abeyance for some time, will again be held half-yearly in January and July. These examinations in medicine and surgery are entirely of a clinical and practical character, partly written and partly oral.

The regulations for admission giving full details should be obtained from the Permanent Under Secretary of State (A.M.D. 1), War Office, Whitehall, London, S.W. 1, and carefully studied. A personal interview with a representative of the Director-General, Army Medical Services, is readily obtainable.

The rates of pay and allowances are good; the opportunities of post-graduate study are generous, and the work is varied, responsible, and interesting. The gratuities after certain periods of service enable an officer should he so desire to leave the Service with a capital sum large enough to go a long way towards re-establishing himself in civil life, and, further, the knowledge of the world and the comradeship of his fellow officers that he has gained in the Army will be of no small value to him.

New entrants are commissioned in the rank of Lieutenant, and the first six months of service are spent on probation, during which time they undergo, in addition to their Military training at the Royal Army Medical Corps Depôt at Aldershot, a probationary course at the Royal Army Medical College in London in Hygiene, Pathology, Tropical Medicine, Military Surgery, Recruiting, the prevention and treatment of Venereal Disease, and the elements of Army Administration. At the end of this course, and after qualifying at the necessary examinations, their commissions are confirmed, and they take their places in seniority according to the total marks obtained at all examinations up to that date. Officers Training Corps service with possession of Certificates "A" or "B" (Medical) carry a definite value in marks in this total.

An entrant who is holding or about to hold at the time of the entrance examination a resident House Appointment at an approved Civil Hospital may be seconded while holding such an appointment up to a maximum period of 12 months. A candidate who has held such an appointment within six months of entry may be granted an antedate up to 12 months in respect of the period the appointment was held. This secondment and antedate counts in all respects as commissioned service, except that pay will not be issued for that period.

After a total period of one year's service at home the young officer goes abroad, probably to India, for his first tour of foreign service. Here he gains his first practical experience of tropical disease and tropical hygiene, and possibly his first experience of active service on the frontiers of India. His tour abroad lasts five years, with probably six months' leave home during that time. On returning home the R.A.M.C. officer has the opportunity to decide whether he will remain in the Corps or accept the gratuity of

£1000 after seven years' service, and try his fortune in civil life. If he elects to remain, he will, between his eighth and twelfth year of service, undergo a course of post-graduate study at the Royal Army Medical College and the London Hospitals of five months' duration, followed by a course of study of a special subject selected by himself, provided he has shown special aptitude in the post-graduate course or during his previous service. During this period of study he remains on full pay, and the fees for the courses are paid by the State. When qualified in his special subject, the officer becomes entitled to specialist pay at 5*s.* per day when holding a specialist appointment. After this post-graduate course the officer probably proceeds abroad again and promotion to Major rapidly ensues, and from that time onward the officer receives regular successive increases of pay, and is eligible for additional and charge pay as well. The Directorates of Hygiene and Pathology and the appointment of two serving officers as Consultants in Medicine and Surgery have been instituted and have proved a marked success, all these appointments being of the rank of Colonel or Major-General.

Under these conditions the possibilities for good workers are very great in the Royal Army Medical Corps. There is scope for original research in tropical disease, in preventive medicine, and in bacteriology, as well as in the large clinical field open to the specialist in Medicine, Surgery or Gynæcology, in Venereal Disease, and in Ophthalmology. Child welfare is also undertaken systematically by officers of the Royal Army Medical Corps.

At the same time instruction in administration is continuous. The Royal Army Medical Corps is essentially organised for war, and one of the lessons of the Great War was that trained administrators must exist to enable the fullest benefit to be obtained from professional talent. Many appointments carrying administrative responsibility are open to those officers who display capacity for this duty. All officers must be prepared to undertake command and to have a knowledge of Army administration, especially in war. Equally important is the technical training of the Non-commissioned Officers and men of the Corps in such "trades" as Trained Nurse, Nursing Orderly, Masseur, Radiographer, Operating Room Assistant, Laboratory Assistant, Hospital Cook, Dispenser, &c. This training is carried out by the Officers and Nursing Sisters, and opens a large field for those who have ability in lecturing and teaching as well as the power of influencing men.

Promotion.

Promotion takes place automatically to Captain after 3½ years, and to Major after 12 years' service, provided the officer is qualified and recommended for promotion. Promotion to the higher ranks is by selection from those senior in the rank below, but special promotion by brevet or otherwise is open to officers of the Royal Army Medical Corps.

Pay and Allowances.

Rank.	Pay per diem.*	Rations.†	Servant.	Married.			Unmarried.		Approximate daily total.		Approximate yearly total.	
				Lodging.	Fuel and light (average)	Furniture allowance.	Lodging.	Fuel and light (average)	Married.	Unmarried.	Married.	Unmarried.
	£ s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	£ s. d.	£ s. d.	£	£
Lieutenant	1 0 8	1 7	2 0	3 6	1 5	2 0	2 3	1 2	1 11 2	1 7 8	569	506
Captain—	1 5 4	1 7	2 0	4 6	3 0	2 0	3 0	1 8	1 18 5	1 13 6	701	612
After 8 years c.s..	1 8 2	1 7	2 0	4 6	3 0	2 0	3 0	1 8	2 1 3	1 16 5	752	664
After 10 years c.s.	1 10 6	1 7	2 0	4 6	3 0	2 0	3 0	1 8	2 3 7	1 18 9	795	707
Major—	1 15 4	1 7	2 0	4 6	3 0	2 0	4 0	2 3	2 8 5	2 5 2	883	824
After 15 years c.s.	2 0 0	1 7	2 0	4 6	3 0	2 0	4 0	2 3	2 13 1	2 9 10	968	909
After 18 years c.s.	2 2 4	1 7	2 0	4 6	3 0	2 0	4 0	2 3	2 15 5	2 12 2	1011	952
After 20 years c.s.	2 7 0	1 7	2 0	4 6	3 0	2 0	4 0	2 3	3 0 1	2 16 10	1096	1037
Lieut.-Colonel ..	2 14 0	1 7	2 0	4 6	3 0	2 0	4 6	2 3	3 7 1	3 4 4	1224	1174
After 3 years c.s. as such	2 18 10	1 7	2 0	4 6	3 0	2 0	4 6	2 3	3 11 11	3 9 2	1312	1262
Colonel	3 5 10	1 7	2 0	5 6	4 1	2 0	5 6	2 8	4 1 0	3 17 8	1478	1419
Major-General ..	4 9 4	1 7	4 0	11 0	5 1	2 0	11 0	3 8	5 13 1	5 9 7	2064	2000

c.s. = commissioned service.

* Pay Warrant rates as amended by A.O. 196/26 less 6 per cent. from July 1st, 1927, vide A.O. 1 of 1927. The Pay Warrant rates are subject to revision to an extent not exceeding 20 per cent. according to variation in the cost of living. The next revision takes place from July 1st, 1930.

† Rates of allowances vary from time to time and issues are subject to conditions laid down in the Allowance Regulations.

Additional Pay and Charge Pay for R.A.M.C. Officers.

(1) Officer not above the rank of lieutenant-colonel, while acting as specialist in a post considered by the Army Council to merit the grant of additional pay, according to subjects or groups of subjects as under.

Operative Surgery, advanced; Medicine; Ophthalmology; Gynæcology and Midwifery; Dermatology and Venereal Disease; Otology, Laryngology, and Rhinology; Radiology; Anæsthetics; Mental Diseases; Hygiene; Pathology; subjects other than above, at the discretion of Our Army Council, 5*s.* daily.

(2) (*a*) Officer in charge of a hospital.—If the number of equipped beds, as certified by the Deputy Director of Medical Services, exceeds—

50 beds ..	2*s.* 6*d.* daily.	300 beds ..	7*s.* 6*d.* daily.
150 „ ..	5*s.* 0*d.* „	500 „ ..	10*s.* 0*d.* „

Officer in charge of a medical or surgical division of a general hospital with not less than 300 beds—half the above rates.

	Daily. s. d.
(*b*) Senior medical officer, Royal Arsenal, not exceeding	10 0
(*c*) Officer in command of the depôt, Royal Army Medical Corps	5 0
(*d*) The senior officer of the Army Medical Services with an army in the field: A rate to be fixed by the Army Council according to the magnitude of the charge.	
(*e*) The officer, if under the substantive rank of colonel, holding the appointment of senior medical officer in a command abroad, or of assistant director of medical services, if the number of soldiers is 1500 or upwards	5 0
(*f*) Adjutant R.A.M.C. Depôt	5 0
(*g*) Adjutant R.A.M.C. (Territorial Army)	2 6

Retirement and Retired Pay.

The following are the rates of retired pay:—

1. Retired pay will consist of two parts: (*a*) a service element based on the officer's total service; (*b*) a rank element for the rank from which the officer retires. An officer with less than 20 complete years' service will not be eligible to retire voluntarily on service retired pay.

2. The scale will be as follows, subject to the reduction of 6 per cent. referred to below:—

(*a*) Service element.—£15 a year for each completed year of service as a medical officer.

(*b*) Rank element.—

Rank from which retired.	After completing 1 year's service in the rank.	After completing each additional year's service.	Maximum rank element.
	£	£	£
Major	12	12	120
Lieutenant-Colonel	150	30	240
Colonel	290	50	390
Major-General ..	440	50	540
Lieutenant-General	590	50	690

The retired pay of an officer retiring with less than one complete year's service in the rank from which he retires will be assessed as though he had retired from the rank below.

Maximum rates of retired pay (*a*) and (*b*) together:—

	£		£
Captain and Subaltern ..	300	Colonel	800
Major	450	Major-General ..	1000
Lieutenant-Colonel ..	600	Lieutenant-General	1200

The above rates are those laid down in the Pay Warrant. They have been reduced by approximately 6 per cent. as from July 1st, 1927, and are subject to future variation with fluctuation in the cost of living.

3. Officers with seven and less than 20 years' service as medical officers may be permitted to retire with a gratuity in accordance with the following scale:—

After 7 years' service as a medical officer.. ..	£1000
„ 15 „ „ „ ..	£2800
„ 18 „ „ „ ..	£3500

The Army Dental Corps.

The Corps is administered by the Director-General, Army Medical Services. It is a joint service for the Army and Royal Air Force, and personnel is required to serve under either force and be interchangeable. Officers and other ranks posted for duty with the Royal Air Force will perform their duties under the Regulations of the Royal Air Force for the employment of dental personnel, but the conditions in the following tables apply equally in either force. Promotion is carried out on one general list. Regulations for admission to the Army Dental Corps should be obtained from the Under-Secretary of State, War Office, and carefully studied.

Officers: *Appointment and Promotion.*

1. Commissions as Lieutenants in the Army Dental Corps may be given to persons duly qualified under regulations approved by the Army Council.

2. An officer who is commissioned after holding a whole-time appointment in a recognised civil dental hospital or in the dental department of a recognised civil general hospital for a period of not less than six months, may be granted an antedate covering the period of his appointment, but not exceeding six months, provided that the interval between the termination of the hospital appointment and the date of entry into the Service shall not ordinarily exceed six months. The period of such antedate will reckon towards promotion, increase of pay, gratuity or pension.

3. An officer is eligible for promotion to the rank of Captain on completion of three and a half years' service and to the rank of Major on completion of 12 years' service in the Corps, provided he has previously qualified in such manner as may be prescribed by the Army Council.

4. Promotion to the rank of Lieutenant-Colonel and Colonel to fill the establishments laid down from time to time for those ranks shall be made by selection of the Army Council, provided the officer has previously qualified for promotion to those ranks in such manner as may be prescribed by the Army Council.

Pay.

The following are the rates for officers of the Army Dental Corps.

These rates are 6 per cent. below those shown in the Pay Warrant, 1926, as amended by Army Order 196/26. The latter are subject to revision to an extent not exceeding 20 per cent., according to variation in the cost of living. The next revision takes place on July 1st, 1930.

	Per diem. £	*s.*	*d.*
Lieutenant	0	18	10
Captain	1	3	6
Captain { after 8 years' total service	1	6	4
Captain { „ 10 „ „ „	1	8	2
Major	1	12	10
Major, after 15 years' total service	1	17	8
„ „ 18 „ „ „	2	0	0
„ „ 20 „ „ „	2	4	8
Lieutenant-Colonel	2	11	8
Lieutenant-Colonel after 3 years' service as such	2	16	4
Colonel	3	3	6

Charge Pay.

The officer in charge of the Dental Laboratories, Aldershot, receives charge pay at the rate of 5*s.* a day if holding the rank of Captain, or 2*s.* 6*d.* a day if holding the rank of Major.

Allowances.

The allowances for officers of the Army Dental Corps are at the same rates as for officers of the Royal Army Medical Corps.

Retirement and Retired Pay or Gratuity.

(1) The rates of retired pay will be the same as for officers of the Royal Army Medical Corps.

(2) Voluntary retirement on retired pay will not be allowed until after twenty years' service.

(3) Earlier retirement on gratuity may be allowed:—

After 8½ years' } service as a Dental { gratuity of £1000.
„ 15 „ } Officer, { „ £2000.
„ 18 „ { „ £3000.

The aim of the Corps is the prevention of wastage on account of dental disease or dental deficiency, and, to enable this to be carried out, every recruit is inspected by a dental officer immediately after joining and all necessary treatment carried out. The soldier is re-inspected at least once a year and his dental efficiency maintained at the best standard possible.

INDIAN MEDICAL SERVICE.

It is the view of many senior officers in the Service that the period of depression is now passing and that the prospect is again bright for those who are fitted in physique and disposition for a medical career in India. The offer of permanent commissions on specially favourable terms to medical men of European descent who were free to sail forthwith to India met last year with the desired response, and the number of commissions granted during the last twelve months is 30.

But the new outlook involves frank acceptance of the Indian reform scheme, the essential of which is increasing participation of Indian-born subjects in the government of the country, although, so long as Europeans are employed in the various departments of the Indian Civil Service, nothing is more certain than that there will and must remain European doctors to attend them. India definitely requires European assistance, not only for the care of the military and civil European population, but for the maintenance in the country of that spirit of modern medicine which has accomplished already such mighty things, and which day by day is spreading in influence and value.

The Government of India issued a communiqué last year dealing in detail with the reorganisation of the medical services in India. The scheme then sanctioned is based on proposals framed in consultation with local governments. The Indian Medical Service, constituted on the same broad lines as at present, will be retained primarily to meet the needs of the Indian army, and in order to maintain two essential requisites —namely, (1) the necessary minimum war reserve of medical officers, and (2) the provision for European medical attendance on officers and their families.

Local governments in India will be required to employ a stated number of I.M.S. officers. It has been calculated that the war reserve to be employed by the civil side should consist of 134 British and 66 Indian officers, the larger proportion of British officers being due to the fact that they cannot be recruited on emergency in India from the ranks of private practitioners. Medical attendance on British personnel, and the requirements of civil administration, for which the Central Government is still responsible, involve the provision of a number of employments termed "residuary," the incumbents of which must be retained permanently in civil employment, so as to ensure the continuance under any circumstances of a skeleton staff to cope with civil requirements. Further details regarding the posts on the civil side were published in the Students' number of 1928.

Rules forming an integral part of the reorganisation scheme have been drawn up to safeguard the varied interests of the Indian army, the provincial governments, and the medical officers themselves (vide THE LANCET, May 19th, 1928, p. 1028). Under these it has now been ruled that as long as any Indian Medical Officers in civil employ in 1928 remain, the administrative posts will be filled from among them.

Thus the social effect of Indianisation should not press hardly on the medical service for the reason that European doctors will be chiefly requisitioned in stations with considerable European communities. In these communities the equipment and organisation of hospitals has been steadily improving and men with professional ambition will find positions which will satisfy their aspirations. On the military side the station hospital system has rendered the position of medical officers more independent by making teamwork possible and permitting of specialisation in various departments of medicine and surgery. Lastly, those who join now will have unequalled prospect of advancement in a Service which has been so depleted for 10 or 15 years or more, and the terms of service announced by the Secretary of State for India in 1926 assure conditions of pay, pension, and furlough much superior to those previously offered.

The New Regulations.

Competitive examination remains suspended for the present and admission to the Service is on written application to the India Office. As sound bodily health is a first essential candidates may, if they wish it, undergo a preliminary examination by a Medical Board which meets weekly at the India Office.

Candidates must be under 32 years of age at the time of application, and must possess a qualification registered in Great Britain and Northern Ireland, under the Medical Acts in force at the time of appointment. Arising out of the recommendations of the Lee Commission the Secretary of State for India in Council after consultation with the Government of India has decided that the Indian Medical Service constituted on the same broad lines as in the past shall be retained primarily to meet the needs of the Indian Army. In order to maintain the necessary minimum war reserve of military medical officers, and to provide for European medical attendance for European officers of the Superior Civil Services and their families, local governments will be required to employ a stated number of Indian Medical Service officers. The Government of India will draw on the same Service to meet the requirements of the civil administration for which they are responsible. For the present 237 such posts have been reserved, and including the leave reserve will provide employment for 302 officers. 212 of these officers will be British medical men and 90 Indians. As the proportion of European to Indian civil officers diminishes these figures will be subject to periodical scrutiny, and, if necessary, to revision. It will be a definite condition of service for all future entrants to the Service that they will be liable to serve on either the civil or the military side. All officers are required to perform two years' military duty subsequent to permanent appointment before they can be considered eligible for civil employment. Executive medical officers in both civil and military employment may attend persons unconnected with Government service provided their duty admits of it. On the military side, however, the opportunities for private practice are not great. Service during the war as a medical or combatant officer, or in a position usually filled by an officer, counts towards promotion and pension so long as the rights of officers who have entered by competition are not interfered with.

Rates of Pay.

The monthly rates of pay for European officers of non-Asiatic domicile in the Service are as tabulated below. The rupee, it may be remembered, has now been definitely stabilised at 1*s.* 6*d.*

Rank and service in rank.	Basic pay.	Overseas pay.	Year of total service.
	Rs.	Rs.	
Lieut.	500	150	First
		150	Second
		150	Third
Captain :—			
1. During first three years' service as Captain.	650	150	Fourth
		£15	Fifth
		£15	Sixth
2. With more than three and less than six years' service as Captain.	750	£25	Seventh
		£25	Eighth
		£25	Ninth
3. With more than six years' service as Captain.	850	£25	Tenth
		£25	Eleventh
		£30	Twelfth
Major :—			
1. During first three years' service as Major	950		
2. With more than three and less than six years' service as Major	1100		
3. With more than six years' service as Major.	1250		
Lieut.-Colonel :—			
1. Until completion of 23 years' total service	1500	£30	Thirteenth and over.
2. During twenty-fourth and twenty-fifth years' total service	1600		
3. After completion of 25 years' total service	1700		
4. When selected for increased pay ..	1850		

Note.—Until the completion of 23 years' total service basic pay is regulated according to rank and service in rank (column 1) which, owing to the system of accelerated promotion, may be in advance of the time-scale of promotion. Overseas pay is regulated solely with reference to length of total service (column 4). In addition to the above rates various allowances are admissible for a large number of special appointments on both the military and the civil side which may be held by members of the I.M.S. Special high rates of pay are also attached to the numerous administrative appointments open to officers in both branches of the Service. The appointment of Director-General, I.M.S., which is held by an I.M.S. officer, carries pay of Rs.3500 per mensem. The appointment of Director of Medical Services in India, carrying pay at Rs.3200 per mensem, may also be held by an officer of the Indian Medical Service.

Initial rates of pay are based on the assumption that the majority of newly appointed officers will be bachelors. Officers on arrival in India will be posted for one year to specially selected stations. Officers in military employment, when in command or second-in-command of the larger station hospitals, receive special allowances. On the civil side there are public health, bacteriological, research, and professorial appointments carrying special enhanced rates. Officers on appointment receive an outfit allowance of £50.

Pensions and Allowances.

The rates of pensions are as shown in the table below.

There are additional pensions not subject to the above reduction ranging from £65 to £350 per annum for officers who have held high administrative appointments as colonels or major-generals.

Service.	Rates per annum.	Service.	Rates per annum.
After 17 years ..	£400	After 23 years ..	£620
„ 18 „ ..	430	„ 24 „ ..	660
„ 19 „ ..	460	„ 25 „ ..	700
„ 20 „ ..	500	„ 26 „ ..	750
„ 21 „ ..	540	„ 27 „ ..	800
„ 22 „ ..	580		

Note.—The above rates are subject to revision triennially upwards or downwards, to an extent not exceeding 20 per cent. in all, on account of a rise or fall in the cost of living, as compared with the year 1919. A deduction of 4½ per cent. on this account has already been made. Nevertheless the full pension of a lieutenant-colonel cannot be cut below the maximum of £700 under the old rules in the case of officers who entered the service before July 1st, 1920.

Officers on appointment are provided with free passage to India, normally by transport. The wives and families of officers who are married prior to the date of the officers' embarkation on first appointment will also be given free passage to India. Officers are granted a certain number of return passages home at Government expense during their career. There are special allowances for officers whilst on study leave.

Further particulars can be obtained on application to the Secretary, Military Department, India Office, Whitehall, London, S.W. 1. Letters should be marked "Recruitment for I.M.S."

ROYAL AIR FORCE MEDICAL SERVICE.

THE Air Council attach great importance to attracting into the Service the best type of medical man, since on the capacity of the Medical Service depends in a peculiar degree the safety and efficiency of the Air Force. The duties of a medical officer in the Air Force include not only the prevention and treatment of those ordinary diseases to which the personnel of any fighting service are liable, but the special study of the mental and physical stresses imposed on the airman in diverse circumstances and climates—a new branch of medicine which still provides considerable scope for research.

As promotion to the higher ranks of the Service is by selection from officers who are eligible by reason of length of service, and as a certain proportion of the higher ranks will be reserved for purely professional as opposed to administrative appointments, it will be seen that there are excellent prospects for the young medical officer who exhibits ability and energy in his professional work.

The work to be done, therefore, has a high professional interest which, combined with good rates of pay and allowances, offers a career for medical men which should prove both attractive and interesting. The life is one which is certain to appeal to the man of wide outlook who desires opportunities for travel, sport, and games, and can find interest and enjoyment in aviation.

His duties will, as a matter of course, give him flying experience as a passenger, which is necessary for the proper study of the medical problems of aviation and for gaining first-hand knowledge of the conditions under which his comrades serve.

The establishment will consist partly of permanent and partly of short-service officers.

An officer will on first entry be granted a short-service commission for a period of three years on the active list (which may be extended to five years at the discretion of the Air Council if the officer so wishes on the recommendation of the Director of Medical Services) and of four years in the Reserve of Air Force Officers. Selections for permanent commissions will be made from officers holding short-service commissions, and those who are not selected will be transferred to the Reserve at the expiration of their period of service on the active list.

For those entrants who desire it the prospect of obtaining a permanent commission is approximately an even one. Experience has so far shown that the officers selected have included the great majority of those desirous of, and suitable for, retention in the Service; owing to the fact that the short-service commission with its gratuity after three or five years is in itself an attraction to many entrants who desire to enlarge their experience and outlook from the point of view of subsequently entering private practice, or who, on entry, have not made up their minds to the adoption of a permanent career in the Service and subsequently find that they would prefer to return to civil life.

For certain purposes medical officers may be allowed to count as service their time spent in resident appointments in civil hospitals under certain well-defined and generous conditions.

Officers who have been selected for permanent commissions may be permitted to attend for a period not exceeding nine months a post-graduate course

ROYAL AIR FORCE MEDICAL BRANCH: RATES OF PAY AND ALLOWANCES.

Rank.	Pay.* Daily rates. Standard.	Pay.* Daily rates. Current.	Pay.* Per annum (current rate).	Cash allowances at home rates in lieu of quarters, rations, and servant, if not available in kind (per annum).† Married.	Cash allowances at home rates in lieu of quarters, rations, and servant, if not available in kind (per annum).† Unmarried.	Pay plus allowances per annum. Married.	Pay plus allowances per annum. Unmarried.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Flying Officer	1 4 0	1 2 6	410 12 6	155 2 6	141 8 9	565 15 0	552 1 3
Flight Lieutenant— ..	1 6 0	1 4 6	447 2 6	202 5 5	159 13 9	649 7 11	606 16 3
After 2 years as such..	1 8 0	1 6 4	480 11 8	202 5 5	159 13 9	682 17 1	640 5 5
After 4 years as such..	1 10 0	1 8 2	514 0 10	202 5 5	159 13 9	716 6 3	673 14 7
Squadron Leader— ..	1 14 0	1 12 0	584 0 0	202 5 5	170 6 8	786 5 5	754 6 8
After 2 years as such..	1 18 0	1 15 8	650 18 4	202 5 5	170 6 8	853 3 9	821 5 0
After 4 years as such..	2 0 0	1 17 8	687 8 4	202 5 5	170 6 8	889 13 9	857 15 0
After 6 years as such..	2 4 0	2 1 4	754 6 8	202 5 5	170 6 8	956 12 1	924 13 4
After 8 years as such..	2 8 0	2 5 2	824 5 10	202 5 5	170 6 8	1026 11 3	994 12 6
After 10 years as such..	2 10 0	2 7 0	857 15 0	202 5 5	170 6 8	1060 0 5	1028 1 8
Wing Commander— ..	2 15 0	2 11 8	942 18 4	202 5 5	180 19 7	1145 3 9	1123 17 11
After 2 years as such..	2 17 0	2 13 6	976 7 6	202 5 5	180 19 7	1178 12 11	1157 7 1
After 4 years as such..	3 3 0	2 19 2	1079 15 10	202 5 5	180 19 7	1282 1 3	1260 15 5
Group Captain	3 10 0	3 5 10	1201 9 2	278 6 3	252 9 2	1479 15 5	1453 18 4
Air Commodore	4 0 0	3 15 2	1371 15 10	333 1 3	307 4 2	1704 17 1	1679 0 0
Air Vice-Marshal.. ..	5 0 0	4 14 0	1715 10 0	398 9 2	371 1 8	2113 19 2	2086 11 8

* Except for periods of service under Indian administration. For such periods officers receive pay and allowances at rates and subject to conditions authorised from time to time by the Government of India.

† These allowances are issued only when accommodation, fuel and light, rations, and personal attendance are not available in kind. Normally, provision in kind is available for junior officers. "Married" rates of allowances are payable only to married officers who have reached the age of 30 or the rank of Squadron Leader. A colonial allowance is granted in certain commands abroad. The rates and general scheme of allowances are liable to revision as circumstances may require.

in general medicine and surgery, tropical and preventive medicine, and other special subjects. Such permission may be granted at any time when the exigencies of the Service permit during the first 16 years of service, and when attending these courses officers will receive full pay and allowances.

New entrants into the Royal Air Force Medical Service will be commissioned as Flying Officers (Medical) and will be eligible for promotion to the rank of Flight Lieutenant (Medical) after two years' service. Officers selected for permanent commissions will normally be promoted to the rank of Squadron Leader after ten years' total service. Accelerated promotion may be granted in a limited number of cases to officers who show exceptional ability after the completion of eight years' service. Promotion within establishment to the rank of Wing Commander will be by selection at any period after 16 years' total service, and that of Group Captain by selection at any period after 22 years' service.

Certain posts in these ranks are reserved for officers fully employed in professional work, such as surgery, pathology, ophthalmology, &c., numbering at present six in all. The number of these posts will be limited only by the needs of the Service and by the necessity of observing a similar proportion between the number of reserved posts and the officers from whom they can be filled, as exists between the total number of higher ranks and the remainder of the medical service. Selections for these reserved posts will be made only from officers professionally qualified to hold them. Officers filling the reserved posts will be eligible for selection to the administrative appointments of their rank, and to the highest administrative appointments.

There will be no competitive examination on entry; candidates must be under 28 years of age, be British subjects, the sons of British subjects, and of pure European descent, be nominated by the dean of a recognised medical school or teaching hospital, and will be interviewed personally by the Director of Medical Services, Royal Air Force, before acceptance. Each candidate must produce :—

1. Birth certificate. 2. Medical registration certificate. 3. A declaration containing the following information: (*a*) Age and place of birth. (*b*) That he is a British subject, the son of British subjects, and of pure European descent. (*c*) That he is ready to engage for general service at home or abroad as required. (*d*) The qualifications he is possessed of, and what medical or other appointments he has held (if any). (*e*) That he is willing to fly as a passenger whenever called upon to do so.

Each candidate will be required, before acceptance, to pass a medical examination to ensure that he labours under no constitutional or mental disease or diseases or weakness, nor any imperfection or disability which may interfere with the efficient discharge of the duties of a medical officer in any climate, in peace or war.

On appointment entrants will undergo an initial course of eight weeks, during which they will be given instruction in the special medical aspects of aviation, the organisation and administration of the Royal Air Force, and the general and special duties to be performed by officers in the Medical Branch.

In order to avoid the necessity for further examinations the position of entrants in order of seniority in the Air Force List will be determined at the end of the initial course by a system of marking and reports on the actual work done during their instruction.

Uniform and Equipment.

Medical officers are required to provide themselves with the uniform, service dress and mess dress of their rank and with the distinguishing badges of the Royal Air Force Medical Branch. The provision of full dress is entirely optional at present. An allowance of £50 towards the cost of uniform is made on joining to candidates who have not had previous commissioned service in H.M. Forces.

Emoluments.

The emoluments of medical officers of the Royal Air Force are given in outline above. The standard rates of pay and retired pay were drawn up on the basis of the high cost of living in 1919, and 20 per cent. of each of the standard rates is detachable and subject to alteration either upwards or downwards as the cost of living rises or falls. Under this provision the current rates now in force represent a reduction of approximately 6 per cent. on the standard rates. The next revision will take effect from July 1st, 1930, and subsequent revisions will be made at intervals of three years.

Retired Pay.

The minimum period of service qualifying for retirement on retired pay is 20 years. Standard rates of retired pay are as follows :—

Air Officers.

Air Vice-Marshal .. .. £790 to £1010 per annum.
Air Commodore .. .. £650 „ £950 „ „

The maximum standard rates of retired pay and the compulsory retiring ages for the several ranks are :—

Rank.	Yearly rate of retired pay.	Compulsory retiring age.
	£	
Air Vice-Marshal ..	1010	60
Air Commodore ..	950	57
Group Captain.. ..	900	55
Wing Commander ..	600	51
Squadron Leader ..	500	48

Retired Pay of Officers below Air Rank.

Age on retirement.	Standard yearly rate of retired pay.	Years of service.	Addition for each extra year of service.*	Deduction for each deficient year of service.*
	£		£	£
40	300	17	15	15
41	337	17	15	15
42	375	18	15	15
43	412	18	15	15
44	450	19	15	15
45	487	19	15	15
46	525	20	15	15
47	562	20	15	15
48	600	21	15	15
49	637	21	15	15
50	675	22	15	15
51	697	22	22	15
52	720	23	22	15
53	742	23	22	15
54	765	24	22	15
55	790	24	22	15

* Limited to five years.

Gratuities.—A permanent officer allowed to retire before having qualified for retired pay may be granted a gratuity provided he has not less than ten years' commissioned service, namely :—

£1500 if he has 10 but less than 15 years' commissioned service.
£2500 „ 15 or more than 15 „ „ „

Short-service officers will be eligible on passing to the Reserve for gratuities on the following scale: £100 for each of the first two complete years of service, £150 for each of the third and fourth complete years, and £200 for the fifth complete year; that is :—

For three years' service on the active list .. £350
For five „ „ „ „ .. £700

These gratuities will not be payable to officers granted permanent commissions, but their service on a short-service commission will count towards retired pay.

COLONIAL MEDICAL SERVICE.

In the self-governing Dominions (Canada, Australia, New Zealand, the Union of South Africa, the Irish Free State, and Newfoundland), and territories under their control, such as Papua and the Cook Islands and in the self-governing colony of Southern Rhodesia, medical appointments are made concerning which information can be obtained from the High Commissioners or Agents-General in London; application for appointments in North Borneo should be made to the British North Borneo Company, 17, St. Helen's-place, E.C., ; appointments in Sarawak are in the hands of H.H. the Rajah. Much valuable information will be found in the "Professional Handbook," Part II., issued by the Oversea Settlement Office, Caxton House, Tothill-street, London, S.W. 1, price 9*d*.

As a general rule, each Colony or Protectorate has its own public service distinct from that of every other; and it is usually only the higher officers who are transferred by the Secretary of State from one Colony to another. There are three exceptions to this rule: (*a*) The West African Medical Staff, which serves Nigeria, the Gold Coast, Sierra Leone, and the Gambia, is one service. (*b*) The East African Medical Service, which serves Kenya, Uganda, Zanzibar, Nyasaland, Somaliland, and the Tanganyika Territory is one service. (*c*) In practice the medical services of the Straits Settlements and the Malay States may be regarded as one, as the officers may be and frequently are transferred from the Colony to the States or vice versa; the two services are now called the Malayan Medical Service.

The Colonies, Protectorates, and Mandated Territories to which medical officers are appointed by the Secretary of State for the Colonies are (*a*) the West African—viz., Nigeria, the Gold Coast, Sierra Leone, and the Gambia, with the Mandated Territories of Togoland and the Cameroons; (*b*) the East African—viz., the Kenya Colony and Protectorate, Uganda, Nyasaland, Somaliland, and Zanzibar Protectorates, the Tanganyika Territory, and Northern Rhodesia; (*c*) the Eastern—viz., Ceylon, the Straits Settlements and Malay States, Hong-Kong, Mauritius, and Seychelles; (*d*) the West Indian—viz., Jamaica, Trinidad, the Windward Islands, the Leeward Islands, Barbados, and the Bahamas; (*e*) Fiji and the Western Pacific, Cyprus, Gibraltar, St. Helena, British Guiana, British Honduras, Bermuda, and the Falkland Islands; and (*f*) Palestine.

In Ceylon, Mauritius, Jamaica, Barbados, the Bahamas, and Bermuda vacancies are practically always filled locally by the appointment of qualified native candidates, or—in the case of some of the higher posts—by transfer from other Colonies. In the Bechuanaland Protectorate, Basutoland, and Swaziland appointments are usually filled locally. Appointments in Malta are all filled locally. In addition, certain medical appointments in the service of the Government of Iraq are filled with the concurrence, and normally upon the recommendation, of the Secretary of State. Vacancies occur most regularly and frequently in the West African Medical Staff, the East African Medical Service, and the Straits Settlements and Malay States.

All applicants for medical appointments in the gift of the Secretary of State for the Colonies should be under 35 years of age, and must be doubly qualified; preference will be given to those who have held hospital appointments as house physicians and house surgeons; testimonials to character and professional competence will be required, and every officer before being definitely appointed will be medically examined by one of the consulting physicians of the Colonial Office: Dr. P. H. Manson-Bahr, D.S.O., F.R.C.P., 9, Weymouth-street, Portland-place, W.1, and Dr. A. E. Horn, C.M.G., 14, Wimpole-street, W.1; Major-General J. J. Gerrard, C.B., C.M.G., the Royal Hospital, Kingsbridge, Dublin; Dr. Foster Coates, 22, College-gardens, Belfast; and Lieut.-Colonel Glen Liston, C.I.E., I.M.S., 33, Comely Bank, Edinburgh, and Dr. C. V. Le Fanu, 33, Rodney-street, Liverpool. Applications for such appointments must be addressed to the Private Secretary (Appointments), Colonial Office, 2, Richmond-terrace, Whitehall, S.W.1.

Instruction in Tropical Medicine.—Every candidate selected for appointment will, unless the Secretary of State decides otherwise, be required to undergo a course of instruction at the London School of Hygiene and Tropical Medicine, Endsleigh-gardens, W.C.1, the Liverpool School of Tropical Medicine, Liverpool University, or at Edinburgh University. The cost of tuition will be borne by the Government, but candidates must make their own arrangements for board and lodging; an allowance of £25 a month will be paid to them monthly in arrear while they are under instruction. Payment of the allowance will be made subject to the candidate signing an agreement by which he is bound to refund it (1) if he declines to accept an appointment in any of the Colonies for which he may be selected; (2) if he fails to obtain a certificate or diploma; (3) if he leaves the Service within three years for any reason other than mental or physical infirmity not caused by his own misconduct.

East African Medical Service.

The Medical staffs of the Kenya Colony and Protectorate, the Uganda, Nyasaland, Somaliland, and Zanzibar Protectorates, and the Tanganyika Territory form one service, the members of which are liable to be posted or transferred to any of the Dependencies as the exigencies of the service may require. The preferences of individual officers are, however, taken into consideration as far as possible.

Selected candidates are appointed as medical officers on probation in the first instance for two years, at the end of which period their appointments are made permanent if their service has been satisfactory. Medical officers (but not health officers) are permitted to take private practice at some stations on the understanding that they give precedence to their official duties. It must be understood that additions to their income from this source are not likely to be substantial, and that the privilege is liable to withdrawal at any time.

Officers are provided with quarters free of rent or the Government may provide temporary accommodation, or an allowance in lieu of quarters may be paid. The salary of a medical or sanitation officer is £600 per annum, rising by annual increments of £30 to £840, and thence by increments of £40 to £920, subject to an efficiency bar at £840. Senior medical officers and senior sanitation officers are paid on the scale £1000 by annual increments of £50 to £1100. Officers who possess the Diploma in Public Health on entering, or who acquire it while in the Service, receive two special increments in the scale.

Officers of the East African Medical Service are permitted to retire with gratuity, if they wish, instead of waiting to retire on pension as follows: (*a*) After nine years' service, of which at least six must have been spent in East Africa, £1000; (*b*) after 12 years' service, of which at least eight must have been spent in East Africa, £1250. If an officer elects to retire with gratuity he thereby forgoes all claim to pension.

The grades and salaries (apart from ordinary medical and sanitation officers) in the medical departments are as follows:—

Kenya.—Director of Medical and Sanitary Services, £1500; Deputy Director of Medical Service, £1200; Deputy Director of Sanitary Service, £1200; Deputy Director of Laboratory Service, £1200.

Uganda.—As Kenya.

Tanganyika Territory.—As Kenya.

Nyasaland.—Director of Medical and Sanitary Services, £1200; Medical Entomologist, £1000–£50–£1100.

Zanzibar.—Director of Medical and Sanitary Services, £1400; Deputy Director of Sanitary Service, £1200; Resident Surgical Officer, £1000–£50–£1100.

Somaliland.—Principal Medical Officer, £1000–£50–£1100.

There are also the following posts:— Resident Surgical Officers (Kenya and Uganda), £1200; Specialist Officer, Sleeping Sickness (Uganda), £1150; Medical Superintendent and Principal of Medical School, Mulago Hospital (Uganda), £1150; Sleeping Sickness Officer (Tanganyika Territory), £1000–£50–£1100; Senior Bacteriologists (Kenya and Uganda), £1000–£50–£1100.

Health officers are selected from the ranks of medical officers as occasion arises.

Asia.

Straits Settlements and Federated Malay States.—European medical officers are appointed on the following scale of salaries: $500 per mensem, rising to $550 per mensem during three years' probation; then, if they are placed on the pensionable establishment, rising to $575 per mensem, and thence by annual increments of $25 per mensem to $800 per mensem, with a strict efficiency bar at $600 per mensem. Officers possessing the D.P.H. receive an additional allowance (non-pensionable) of $100 per mensem.

Above the concluding figure of $800 per mensem there are certain higher appointments, as follows: Principal Civil Medical Officer, Straits Settlements, and Principal Medical Officer, Federated Malay States, $1200 per mensem; Director, Institute for Medical Research, Federated Malay States, Chief Health Officer, Federated Malay States, and Principal Medical College, Straits Settlements, $1100 per mensem; 12 posts at $1050 per mensem; and 29 posts at $850 per mensem, rising annually by $30 to $1000 per mensem.

The following temporary allowances are at present paid to all officers recruited from Europe in the Government Services of the Straits Settlements and Federated Malay States: unmarried officers, 10 per cent. of salary; married officers, 20 per cent. of salary. Private practice by Government medical officers is not allowed, but consultation work with another practitioner is permitted. Information about general conditions in Malaya is obtainable from the Malayan Information Agency, 57, Charing Cross, S.W. 1.

Seychelles.—The chief medical officer receives Rs.7000 per annum. There are four assistant Government medical officers, two receiving Rs.6500, the others Rs.3000 per annum.

Hong-Kong.—The present establishment of the medical department is: director of medical and sanitary services, £1200–£50–£1450; deputy director, £1125–£25–£1200; senior medical officer, £1025–£25–£1100; three medical officers of health, £740–£30–£1040; health officer of the port, and second health officer of the port, £740–£30–£1040; five medical officers, £600–£30–£1020; bacteriologist, £800–£1100; assistant bacteriologist, £740–£30–£1040; radiologist, £740–£30–£1040; analyst, £625–£25–£900; assistant analyst, £400–£25–£700. A temporary allowance on a scale varying with the sterling exchange value of the dollar is at present payable. Salaries are converted locally at the rate of 2*s.* = $1. Free quarters are not provided, but in certain instances a rent allowance is paid by the Government.

America.

British Guiana.—There are the following posts in the medical service of the Colony: one surgeon-general, £1000–£1200 per annum, with consulting practice; one medical officer of health, £900; ophthalmologist, £700; one bacteriologist and pathologist, £700; 37 medical officers at £500–£25–£700. Most of the senior posts in institutions carry duty allowances (varying from £50 to £300 per annum) and quarters.

Trinidad and Tobago.—In Trinidad and Tobago there are about 40 appointments. Government medical officers receive salary at the rate of £400 per annum, rising by annual increments of £25 to £600. An officer appointed to a district receives, in addition to his salary, a travelling allowance varying from £100 per annum in a normal district to £150 per annum, and is allowed private practice, the value of which is estimated at from £50 to £800 per annum. Officers employed in institution work receive a duty allowance varying from £50 to £300. Medical officers having completed 10 years' resident service are pensionable at the age of 55.

Windward Islands (Grenada, St. Lucia, St. Vincent). There are over 25 appointments. The chief medical officer, Grenada, receives £750. The chief medical officer, St. Lucia, receives £600–£700 plus forage and subsistence allowances; the post is pensionable, but private practice is not allowed except as a consultant. Most of the remaining appointments are district appointments with the right to private practice attached; the salaries paid by Government are on the scale from £400–£500, except in St. Vincent, where the maximum is £450. The Governor has the power to transfer a medical officer from one island to another. Appointments are pensionable.

Leeward Islands (Antigua, St. Christopher and Nevis, Dominica, Montserrat, Virgin Islands).—The appointments are similar in number and character to those in the Windward Islands, and are pensionable. An officer when first sent out is not appointed to a particular island but to the service of the Leeward Islands, with a salary of £350, and is later appointed to a definite district at a salary varying from £312 to £400–£25–£450, and the Governor decides as to the district which is to be allotted to him, according to station. He is liable to be transferred at the Governor's discretion to any medical district in the Leeward Islands. The medical officers, except in St. Christopher and Nevis, receive fees for successful vaccinations, post-mortem examinations, evidence at courts of justice, certificates of lunacy, and, in the larger islands, for burial certificates. They are also, as a rule, allowed private practice. The chief medical officer, St. Christopher and Nevis, receives £700–£25–£750, but is not allowed private practice, except as a consultant.

British Honduras.—There are seven medical appointments (besides the post of principal medical officer at a salary of $2430 per annum with increments of $120 to $3150. Unless they already possess a diploma of public health, medical officers are liable to be required, before they join the colony, to undergo a course of instruction at a laboratory of public health or analogous institution. The value of the dollar is the same as that of the United States dollar.

Other Overseas Appointments.

Fiji.—The Chief Medical Officer receives £1000–£50–£1100, with free quarters, unfurnished; the Medical Superintendent, Colonial War Memorial Hospital, £800–£50–£1000, with £40 car allowance and free quarters; the Medical Superintendent, Leper Asylum, £750–£50–£950, with completely furnished quarters and one servant; the Medical Officer of Health, £750–£25–£900, no quarters provided. There are 14 District Medical Officers who receive £500–£25–£725, with partly furnished quarters or £50 house allowance (at the option of the Government) and duty allowance of £50 per annum in districts where no private practice exists. In certain districts house allowances or car allowances are granted. In others a medical officer is provided with a launch or boat. District Medical Officers are allowed private practice on the understanding that their official duties are not neglected. In five districts the Medical Officer is also District Commissioner and receives an additional allowance of from £175 to £275 and free partly-furnished quarters. In most districts there is private practice, the value of which has been estimated at from £100 to £600 a year.

Western Pacific High Commission.—The staff in the British Solomon Islands Protectorate consists of a Senior Medical Officer (£650–£750), two District Medical Officers (£550–£650), and one Travelling

Medical Officer (£550–£650). Partly-furnished quarters are provided and a local allowance of £50 per annum is paid to the Senior Medical Officer and the District Medical Officers. A local allowance of £50, consolidated travelling and subsistence allowance £200, and partly-furnished quarters are provided for the Travelling Medical Officer.

In the Gilbert and Ellice Islands Colony there is a Senior Medical Officer (£650–£750), with partly-furnished quarters, and one Medical Officer (£600–£25–£650), with partly-furnished quarters or house allowance. There is hardly any private practice in the British Solomon Islands Protectorate or the Gilbert and Ellice Islands Colony.

Cyprus.—There is a chief medical officer paid at the rate of £750, rising by annual increments of £25 to £850, and three district medical officers paid at the rate of £500 a year, rising by annual increments of £20 to £600 a year, all enjoying private practice (except the chief medical officer and one of the district medical officers, who are allowed consulting practice only). There is also a post of consulting surgeon, £400–£20–£600 a year, with consulting practice. There is also a medical officer of health on £600, rising by £20 increments to £750 without private practice, and a specialist in venereal diseases with a salary of £700 a year and consulting practice; these are the only medical appointments open to British candidates.

Gibraltar.—There is a surgeon of the Colonial Hospital receiving £730, and private practice. There are also two assistant surgeons with a salary of £600 for 3 years and thereafter £650–£25–£700 per annum, who are allowed private consulting practice only. Free quarters, unfurnished, are provided for all three officers.

St. Helena.—The colonial surgeon at present receives £550 per annum, fees estimated at about £27 a year, and £30 horse allowance. The assistant colonial surgeon at present receives £500 a year and £30 horse allowance. Private practice is allowed, and such practice, together with the duties of non-Government appointments, is divided between the colonial surgeon and the assistant colonial surgeon in a proportion approved by the Governor. The value of private practice and appointments is estimated at about £536 a year.

Falkland Islands.—There are two appointments. The colonial surgeon is paid at the rate of £800 per annum, with free furnished quarters, and £200 in lieu of private practice. The assistant colonial surgeon is paid at the rate of £500 per annum, with an allowance of £50 per annum in lieu of quarters, and is allowed private practice. The office of colonial surgeon is pensionable.

Palestine.[1]—The grades and salaries of higher appointments in the Department of Health are: Director, £P.1200, plus £P.200 expatriation allowance. Deputy Director, £P.900–50–£P.1100, plus £P.150 expatriation allowance. Assistant Director (Laboratories), Specialist Surgeon,[2] and five Senior Medical Officers, £P.750–25–950, plus £P.100 expatriation allowance. One Senior Medical Officer and Government Analyst, £P.550–25–750, plus £P.100 expatriation allowance. The remainder of the staff is recruited locally. A temporary and variable cost-of-living allowance is at present payable in addition to the salaries stated above.

Iraq.—The grades and salaries of the principal appointments in the Department of Health are: Inspector-General of Health, Rs.1800–100–2800 a month; Health Specialists, Directors of Hospitals and Institutes, Chief Medical Officers in Mosul and Kirkuk, Medical Officers of Health in Baghdad and Basra, Rs.1500–75–1800–100–2300 a month; Medical Officers, Rs.1200–75–1800 a month. Posts in the service of the Government of Iraq are not pensionable. Every officer (unless serving on a 3 years' contract) is required to contribute one-twelfth of his pay to a provident fund, to which the Government makes a contribution equal to one-sixth of his pay.

[1] £P.1 = £1 sterling.
[2] A certain amount of private practice is allowed.

Leave and Pensions.

Leave and Passages.—Leave of absence in East Africa. The normal tour of service is 20 to 30 months (less in Somaliland) after which leave is granted with full salary for 2½ to 3½ days, according to the districts in which the officer has served, for each month of service, plus the period of the voyage to England. If the officer is returning to East Africa for further service, he receives a further similar amount of leave, plus the period of the voyage to East Africa. Extensions of leave with full salary are given in case of sickness or in the case of officers attending approved courses of instruction. In addition to the above, local leave may be granted up to 14 days a year. Officers serving in Northern Rhodesia are allowed four (or two) days' leave in respect of each month of service. Free first-class passages are provided for the officer on first appointment and on leave, and in certain cases assistance towards family passages is given.

In the Malay Peninsula two months' leave of absence with full salary may be granted in respect of each year's service, and this leave may be accumulated up to a maximum of eight months. Additional leave on half-pay may be granted on special grounds. Officers are provided with free passages on first appointment for themselves and their families (i.e., wife and children up to five persons, inclusive of the officer). Under temporary regulations at present in force, free return passages on leave to all officers (and their wives and their children under the age of 10) irrespective of salary. Improvements in the leave conditions of officers serving in Malaya are under consideration.

In other Colonies outside Tropical Africa, subject to the necessities of the service, leave of absence on half salary may be granted after a period of three years' resident service without any special grounds. It may be given before the expiration of that period in case of serious indisposition, or of urgent private affairs. In the absence of special grounds, the leave must not exceed one-sixth of the officer's resident service; on special grounds it may exceed that period by six months. In addition to the above, vacation leave on full pay may be granted, if no inconvenience or expense is caused thereby, not exceeding three months[3] in any two years. British Guiana, Jamaica, and Trinidad officers are allowed to accumulate full-pay leave at the rate of six weeks for each year's service up to six months, exclusive of the period of the voyages to and fro, and no leave of absence may (except in very special circumstances) exceed six months in all unless the officer has served for five years or more without leave, in which case two months on half-pay may be taken in addition to six months' full-pay leave.

On first appointment an officer will, except in the case of a few Colonies possessing Representative Assemblies, be provided by the Crown Agents for the Colonies with free passages to the Colony for himself and his wife and children, if any, not exceeding four persons besides himself. The officer so appointed will be required to execute an agreement binding him to repay the cost of the passage or passages so obtained in the event of his leaving the Government service within three years. An officer taking leave out of the Colony has in most cases to provide his own passages.

Pensions.—East Africa.—Officers on the pensionable establishment may retire (or be retired by the Government) on attaining the age of 50 years; but they may be retained in the service, with their own consent, for such further period as the Government may recommend. Earlier retirement in the event of ill-health is also provided for. Pension is computed at one-four hundred and eightieth of

[3] Or, in the case of Fiji and the Western Pacific and the Falkland Islands 4½ months in any three years.

pensionable emoluments—i.e., salary and value of free quarters [4] in respect of each month's pensionable service—at the time of retirement, subject to an average of emoluments for the last three years before retirement instead of the actual emoluments at the time of retirement being taken as the basis for calculation in certain circumstances.

Other Colonies.—In most of the other Colonies an officer holding a pensionable appointment may be allowed in the case of ill-health to retire on a pension after ten full years' resident service; otherwise he must have attained the age of 55. For ten full years' resident service fifteen-sixtieths of the average annual salary of the retiring officer's fixed appointments for three years prior to retirement may be awarded, to which one-sixtieth may be added for each additional year's service; but no addition will be made in respect of any service beyond 35 years. For pension purposes absence on vacation leave counts as full service, and leave on half-pay as half service. In a few cases the retiring age is 60 and the pension after ten years' service is ten-sixtieths instead of fifteen. In the Straits Settlements and Malay States, an officer may, with the consent of Government, retire at age 50. Pensions are calculated on a basis of length of service in months instead of years.

West African Medical Staff.

Applicants for appointment as medical officers or medical officers of health in the West African Medical Staff (the higher grades will usually be filled by promotion from the lower) must be British subjects of European parentage and between 23 and 35 years of age; preference is given to candidates who are over 25 years of age. Applicants must possess a complete double qualification, and must be on the Medical Register. Passages for wives and children are not provided by the Government, and houses for the wives of junior medical officers are rarely available. Officers are not usually allowed to take their wives and young children out with them until they have acquired experience of the local conditions and have obtained the sanction of the Governor. When an officer has obtained permission to be accompanied by his wife a grant of one-half the cost of his wife's passage to and from West Africa is made subject to certain conditions.

Candidates are allowed to express a preference for any particular Colony, and their wishes in this respect will be borne in mind and met as far as possible, but they are liable to be posted in the first instance, or transferred afterwards if necessary to any other West African Colony at the discretion of the Secretary of State. Candidates who wish to be posted to Nigeria will probably find it useful to be able to ride. Transfers from one Colony to another will be made as seldom as possible. Candidates should on no account apply for, or accept, a West African appointment in the expectation of ultimately being transferred.

Those transferred to pensionable Crown appointments elsewhere than in West Africa do not forfeit their claim to pension in respect of their West African service on final retirement, provided that they have been members of the staff for at least 12 months. Every officer selected for appointment is required to have himself revaccinated before proceeding to West Africa, unless one of the medical advisers of the Colonial Office certifies that this is unnecessary.

Leave of Absence.—European officers in West Africa may be granted vacation leave on full salary not exceeding in all one week's leave in the United Kingdom for every completed calendar month of total residential service in West Africa, plus the time necessarily taken on the journey to the United Kingdom, and, if the officer is returning to West Africa for further service, the time necessarily taken on the journey from the United Kingdom to the Colony. Vacation leave may be granted without any special grounds after 18 consecutive calendar months of residential service in West Africa. An officer will not be required to serve a tour of more than 24 consecutive calendar months' residential service except in special circumstances; and the Governor may grant vacation leave to any officer at any time after he has completed 12 consecutive calendar months' residential service within the above limits, the actual length of each officer's tour will be at the discretion of the Governor. Vacation leave on full salary may also be granted to an officer if he is invalided from West Africa after less than 12 consecutive calendar months' residential service, and sick leave on full salary may be granted for any period not exceeding six calendar months.

Appointments and Salaries.—Medical officers for the West African Colonies and Protectorates—namely, the Gambia, Sierra Leone, the Gold Coast (including Ashanti and the Northern Territories), and Nigeria (Southern and Northern Provinces)—are selected by the Secretary of State for the Colonies, and are on one list for employment and promotion. The grades and emoluments of the Staff are at present as follows:—

The Director of the Medical and Sanitary Service, Nigeria, receives a salary of £1800 a year, with a duty allowance at the rate of £360 a year. The Director of Medical and Sanitary Service in the Gold Coast receives a salary of £1600 a year, with a duty allowance at the rate of £320 a year. The Director of Medical and Sanitary Service in Sierra Leone receives a salary of £1400 a year, with a duty allowance at the rate of £280 a year. The Deputy Director of Medical and Sanitary Service, Nigeria, and the Deputy Director of Sanitary Service, Nigeria, receive salaries of £1500 a year, with duty allowances at the rate of £300 a year. The Deputy Director of Medical and Sanitary Service, Gold Coast, and the Assistant Director of Medical and Sanitary Services, Nigeria, receive salaries of £1400 a year, with duty allowances at the rate of £280 a year. Assistant Directors Medical Service: There are seven appointments on this grade, five in Nigeria, two in the Gold Coast. The salary is at the rate of £1300 a year, with duty allowance at the rate of £260 a year. The Assistant Director of Sanitary Service, Nigeria, the Deputy Director of Sanitary Service in the Gold Coast and the Deputy Director of Sanitary Service in Sierra Leone receive salary at the rate of £1300 a year, with duty allowance at the rate of £260 a year. Specialists: The number of these appointments is not fixed, officers of outstanding professional merit being eligible for appointment. The salary is at the rate of £1300 a year, with duty allowance at the rate of £260 a year. After five years' approved service as such, the specialist officer is eligible to receive a salary at the rate of £1400 a year, with duty allowance at the rate of £280 a year. There are at present five officers appointed specialists in Nigeria, three in the Gold Coast, and one in Sierra Leone. Senior Medical Officer: There are twenty appointments of this grade, with salary at the rate of £1000 a year, rising by annual increments of £50 to £1150 a year, and seniority allowance at the rate of £100 a year. The Senior Medical Officer, Gambia, is allowed "staff pay" of £150 a year, in addition to duty allowance, but he is debarred from private practice. Senior Sanitary Officer: There are nine appointments of this grade, with salary at the rate of £1050 a year, rising by annual increments of £50 to £1200 a year, and a duty allowance at the rate of £210 a year. Possession of the Diploma in Public Health is usually required for appointment to this grade. Special facilities are granted to study for the diploma during leave. Medical Officers of Health: There are at present 24 appointments of this grade. The salary scale is the same as that of Medical Officers, except that Medical Officers of Health are granted an initial salary at the rate of £800 a year, together with seniority allowance at the rate of £72 a year and staff pay at the rate of £150 a year, half of which is payable during leave. After three years' service on the maximum of the scale, viz., £960 a year, and on undergoing an approved course of study, Medical Officers of Health are eligible, if unpromoted, subject to the recommendation of the Governor, to be placed on the scale £1000 a year rising by annual increments of £50 to £1150 a year, together with seniority allowance at the rate of £100 a year and staff pay as before. The holders of these appointments are not allowed private practice. Candidates selected for service as Medical Officers of Health must obtain the Diploma in Tropical Medicine and Hygiene of Cambridge, London, or Liverpool as a condition of appointment, or must be in possession of the Diploma in Public

[4] The value of free quarters for pension purposes is taken as 15 per cent. of the minimum salary of the grade in which an officer is serving at the time of retirement, subject to a maximum of £150.

Health. They are appointed subject to the condition that, if after a period of service in West Africa they are considered unsuitable to serve in that capacity, they may be called upon to transfer to the medical side. In such cases the officers are given the rate of salary which they would have reached if they had been appointed to be Medical Officers instead of Medical Officers of Health in the first instance. Medical Officer: The salary attached to this grade is at the rate of £660 a year, rising by annual increments of £30 to £720 a year. Then, if confirmed in the appointment, £720 a year, rising by annual increments of £40 to £960, with seniority allowance at the rate of £72 a year. Before passing £800, medical officers are required to take a special course of study for three months. If they obtain satisfactory certificates at the end of the course they draw their further increments up to £960 a year.

A medical officer who has served for three years on the maximum salary of this scale (£960) without obtaining promotion is eligible, if recommended by the Governor, to be placed on the scale £1000–£50–£1150, with £100 seniority allowance (as for Senior Medical Officers).

Special Appointments.—The Director of the Medical Research Institute, Lagos, and the Director of the Medical Research Institute, Accra, receive a salary of £1300 a year, with a duty allowance of £260 a year, rising after five years' approved service to a salary at the rate of £1400 a year and duty allowance at the rate of £280 a year. There are a number of appointments for pathologists and bacteriologists in Nigeria, the Gold Coast, and Sierra Leone. The salary and other conditions attached to these posts are similar to those of Medical Officers of Health. Duty allowances, seniority allowance, and staff pay are not pensionable emoluments.

Increments.—Increments to salaries are payable only when the service of an officer during the period of employment qualifying for increment is approved.

Payment of Salaries.—Information as to the payment of officers' salaries or of monthly remittances to persons in England may be obtained from the Crown Agents for the Colonies, 4, Millbank, S.W. 1. All allowances are paid locally.

All officers of the staff, except directors, deputy directors, assistant directors, senior sanitary officers, medical officers of health, research officers, and a few other officers holding special appointments, are at present allowed to take private practice, provided that it does not interfere with the faithful and efficient performance of their official duties, but it is within the power of the Governor to withdraw or suspend the privilege in such places and for such periods as he may consider desirable. Private practice does not exist at many stations, and no guarantee can be given that an officer will be posted to a station in which he will be able to practise privately. As a general rule, and subject to the exigencies of the service, stations where there is private practice are allocated to senior members of the Staff.

Pensions and Gratuities.—Pensions and gratuities on retirement are granted in accordance with the law and regulations of each individual Colony.

African Medical Officers.—In addition to the membership of the West African Medical Staff, which is limited to British subjects of European parentage, there are a number of Government appointments for African medical officers in the West African Colonies. These appointments carry a salary on the scale £500–20–£600, and there is a higher scale, £600–30–£720. In addition, in Nigeria and on the Gold Coast, arrangements have been made for the employment of a few young African medical men temporarily on the hospital staffs, with a view to appointment to the Government service later, if suitable. In such cases a salary of £400 a year is paid.

Sudan Medical Service.

This Service is responsible for carrying out civil, medical, and public health duties in the Sudan.

The staff consists of: (*a*) A Director, pay £1500–£2000. (*b*) A Senior Physician and a Senior Surgeon to the Khartoum and Omdurman Civil Hospitals, each with a pay of £1200–£1750. (*c*) An Assistant Director. (*d*) Medical Officer of Health, Khartoum Province, at a special rate of pay. (*e*) 31 British "Senior Medical Inspectors" and "Medical Inspectors" whose pay commences at £720 and rises, subject to the recommendation of the Director, by five biennial increases to £1080, and after 13 years' service to £1200. The Senior Medical Inspectors are eligible, by selection, for the four senior posts. All Medical Inspectors are appointed, in the first place, on probation for two years, and if at the end of that time they are accepted for permanent service under the Sudan Government, the first increase of pay is subject to their passing an examination in Arabic.

In addition to the above there are (*f*) a number of Medical Officers trained at one of the Syrian Medical Schools, besides (*g*) Sudanese Medical Officers trained at the School of Medicine at Khartoum. There are several native (*h*) Assistant Medical Officers, who have been given a purely practical training in one of the larger hospitals in the Sudan.

Amongst the attractions of the Service are: The great variety of the work met with among many different races of the Sudan; *leave* of 90 days, which is granted every year after the first 18 months of service; *study-leave*, which may be given for some definite purpose, whilst two years towards pensionable service may be granted to those who have special qualifications and experience. The pension for Medical Inspectors who retire after 20 years' service is not less than £E.500 a year. If, however, he serves for a longer period, or is appointed to one of the higher posts, he will receive a larger pension. Private practice is allowed, but is limited to a few of the larger towns, and may be carried on so long as it does not interfere, in any way, with official duties. These duties include acting as consultant to the principal hospitals and the supervision of medical and public health work, the inspection of schools, the examination of candidates for Government service and pension, and the training of Assistant Medical Officers and native Sanitary Overseers. The Khartoum Medical School is staffed mainly by members of the Medical Service, who receive additional remuneration for their work as teachers. A Registrar of the Medical School is also selected from the Service, who receives £250 a year extra pay.

The country is developing rapidly, and the Medical Department is being increased to meet its growing requirements. Vacancies are always advertised in THE LANCET as they occur.

Candidates must be single and should be under 30 years of age, and they must have held a resident post, preferably that of house surgeon, in a large general hospital. As a rule they are required to take out a course in Tropical Medicine before they leave England for the Sudan. The fees for this course are paid by the Sudan Government, and in addition an allowance £.E.25 per month is made, under certain conditions, to each selected candidate who attends it.

Inquiries for further information should be made to Dr. Hodson, 24, Welbeck-street, London, W.1, or to the Deans of the Principal Medical Schools.

WOMEN'S MEDICAL SERVICE FOR INDIA.

AMONG careers open to medical women abroad the Women's Medical Service for India deserves honourable mention. This service is open to fully qualified medical women of British or Indian nationality, and with the present amount of Government subsidy the number of medical officers is limited to 42. Medical women proceeding to India to join the Women's Medical Service receive a sufficient sum for a first-class passage to India. On landing they are posted to one of the larger women's hospitals to gain Indian experience and to learn the language. During this period (from six months to two years) private practice is not allowed. For a further period they are appointed to act temporarily for

medical women on furlough, during which time private practice is allowed. They are then definitely appointed to the charge of hospitals. Private practice is always allowed after the first two years, provided it does not interfere with official duties. The only exception is in administrative or educational posts, when an allowance in lieu of practice is given. The amount obtained from practice varies according to the station, but in most cases it forms a fair addition to the salary, varying from £150 to £1000 a year.

Excellent opportunities for surgery—especially gynæcological—are found in the Women's Medical Service. To those who are not keen surgeons opportunities are likely to open in the future in connexion with maternity and child welfare; medical women with administrative ability are also needed for the inspection of women's hospitals and other medical institutions.

Rates of pay are as follows:—

Years of service.	Overseas allowance per mensem.	Salary per mensem.	English equivalent* per annum.
1 to 3	Rs.100	Rs.450	£440
4 to 6	,,	Rs.500	£480
7 to 9	,,	Rs.550	£520
10 to 12	,,	Rs.600	£560
13 to 15	Rs.150	Rs.650	£600
16 to 18	,,	Rs.700	£640
19 to 21	,,	Rs.750	£680
22 to 24	,,	Rs.800	£720
over 24	,,	Rs.850	£760

* At rupee value 1s. 4d.

Furnished quarters are provided, representing an additional Rs.150 per mensem.

The cost of living in India is much higher than formerly, but it should be possible for a medical woman (with house provided) to meet actual household expenses for about Rs.200 per mensem, leaving the remainder of her salary for dress and personal expenses. To this must be added the necessary saving to meet additional expense for furlough and leave spent in the hills.

One month's privilege leave on full pay is granted each year. Furlough on half-pay at the rate of two months for every year of service is granted after every three years. Study-leave on two-thirds pay is granted to the extent of 12 months in the total service. There is a provident fund to which members of the service contribute 10 per cent. of their pay. The service contributes another 10 per cent., which accumulates at interest and is repaid on retirement.

Admission to the service is made by selection. Candidates in the United Kingdom should apply to the Hon. Secretary, United Kingdom Branch of the Countess of Dufferin's Fund, care of Lt.-Col. Sir Leonard Rogers, India Office, Whitehall, London.

GUILD OF ST. LUKE.

THE Guild of St. Luke was founded over 60 years ago by a few medical students, chiefly to meet their own religious needs. It now makes a wider appeal, and its membership is open to all students and practitioners of medicine, both men and women, who are members of the Church of England, the clergy of which are eligible as Clerical Associates. The Chapter meets in every month of each term, and a festival service is held yearly at St. Luke's tide, usually at St. Paul's or Westminster Abbey. This year the service will be at the Abbey. Besides the parent Guild, there are a Women's Ward and a Hospital Student's Branch in London. There are also a Midland Counties Ward and a Cambridge Ward. Particulars of the objects and activities of the Guild and forms of application for membership can be obtained from the Secretary of the Guild of St. Luke, King's College, Strand, W.C.2.

SPECIAL DIPLOMAS.

DIPLOMA IN TROPICAL MEDICINE.

ALTHOUGH a qualification in tropical medicine has not been made registrable by statute, a diploma is regarded as indispensable for appointments in the Colonial Medical Service and similar positions abroad. Systematic instruction for these diplomas is given at the Incorporated Liverpool School of Tropical Medicine (founded in 1898) and at the London School of Hygiene and Tropical Medicine, Keppel-street, Gower-street, London, W.C.; while the Universities of Cambridge, London, Edinburgh, and the English Conjoint Board grant the diploma.

London School of Hygiene and Tropical Medicine.—The courses of study in all branches of the work of the School will commence in October in the new premises in Keppel-street (Gower-street), the gift of the Rockefeller Foundation, which has excellent laboratories and research rooms, a fine lecture theatre and classrooms, library, and museum.

The courses of study in Tropical Medicine and Hygiene which have hitherto been given at Endsleigh Gardens will be given in the new building. There are two courses in the year, each lasting 20 weeks, inclusive of examinations. The dates for the commencement of the next courses are Sept. 30th, 1929, and Feb. 3rd, 1930. The course covers the work required for the D.T.M. & H. (England), and part of that required for the M.D. in Tropical Medicine of the University of London.

The first course of study for the Diploma in Public Health will commence on Sept. 30th, and will extend over a period of 12 calendar months. It is arranged in compliance with the requirements of the General Medical Council, and students taking the course will be able, should they so desire, to proceed to the new academic Diploma in Public Health of London University. The curriculum has been planned on very practical lines, and includes, in addition to work with Medical Officers of Health in two selected areas, a large number of visits to places of public health interest. A series of 5 o'clock lectures will be given by eminent authorities on special subjects, and these lectures will be open to members of the medical profession as well as to students of the School. The London County Council, the City of London, and various other bodies have placed their resources at the disposal of the School for teaching purposes.

The special course of study for the Diploma in Bacteriology covers a period of one academic year, beginning in October, and special three-monthly courses are given in Epidemiology and Vital Statistics.

University of Liverpool.—The University grants a Diploma in Tropical Medicine. At the end of each full course an examination is held by the University for its Diploma of Tropical Medicine (D.T.M.), which is open only to those who have been through the course of instruction of the school. The subjects of examination are (*a*) Parasitology and Tropical Pathology. (*b*) Entomology. (*c*) Tropical Medicine, including Ætiology, Symptoms, Diagnosis and Treatment of Tropical Diseases. The advanced course consists entirely of Practical and Clinical Laboratory Work, given at the laboratory at the University. Applications should be made to the Dean of the Medical Faculty, University of Liverpool.

The University also grants a diploma in Tropical Hygiene (D.T.H.). The subjects of examination are (*a*) Tropical Hygiene (including Sanitary Engineering, Vital Statistics and Epidemiology and Applied Parasitology and Entomology). (*b*) Practical Sanitation. (*c*) Bacteriology. (*d*) Chemistry (including Meteorology and Climatology). Two University Fellowships of £100 a year each are open to students of the school, amongst others. Accommodation for research work is to be had at the University Laboratory. The Mary Kingsley Medal is awarded by the school for distinguished work in connexion with Tropical Medicine.

University of Cambridge.—The examination for the Diploma in Tropical Medicine and Hygiene is divided into two parts. Part I. is held in Cambridge in April and Part II. in July in London. Candidates for Part I. are examined under the same regulations and in the same subjects as candidates for the Diploma in Public Health, but any qualification in medicine or surgery recognised by the proper authority of any country outside the British Dominions may be recognised. The subjects for Part II. are Medicine, Surgery, and Hygiene in their relation to Tropical Disease.

The examination will be partly in writing, partly oral, and partly practical or clinical (the clinical part will be conducted at a hospital for tropical diseases, at which cases will be submitted for diagnosis and comment). Every candidate who passes the examination to the satisfaction of the examiners will receive from the University a diploma (D.T.M. & H.) testifying to his knowledge and skill in tropical medicine and hygiene.

Further information respecting the courses of study and examinations may be obtained from Mr. J. E. Purvis, Public Health Chemical Laboratory, Cambridge.

University of Edinburgh.—Candidates for the Diploma in Tropical Medicine and Hygiene must be graduates in medicine and surgery of the University of Edinburgh or hold corresponding registrable degrees or qualifications of some other licensing body. The course of instruction, comprising a primary and a second course, is given during the autumn and spring terms, October to March, and includes Tropical Hygiene, Bacteriology, Entomology and Parasitology, Diseases of Tropical Climates (systematic and clinical), Tuberculosis, and Venereal Diseases. The primary course alone is also given during the summer term, April to June. Provision is made in the University for instruction in all subjects. The examinations are written, oral, and practical, and are held at the end of the courses. Candidates are required on the first occasion of presenting themselves for examination to appear for all the subjects. Candidates who fail to pass the entire examination within a period of 12 months after first appearance are required to reappear for all the subjects. The University is included in the list of Institutions whose courses of instruction in Tropical Medicine may be taken by officers on appointment to the Colonial Medical Services or during study-leave. Full particulars can be obtained from the Dean of the Faculty of Medicine.

Conjoint Board R.C.P. Lond., R.C.S. Eng.—The diploma of D.T.M. & H. Eng. is awarded on the results of an examination held twice yearly, in March and July. Candidates must possess a registrable qualification, and produce evidence of having attended (1) practical instruction in pathology, protozoology, helminthology, entomology, bacteriology, and hygiene in relation to tropical medicine in a recognised institution during not less than five months; (2) clinical practice of a recognised hospital for the same period. Conditions of study may be modified in the case of candidates of special experience. Further particulars from the Secretary, Examination Hall, Queen-square, London, W.C.1.

DIPLOMA IN PSYCHOLOGICAL MEDICINE.

The Universities of Cambridge, London, Durham, Leeds, Manchester, Edinburgh, Dublin, National University of Ireland, and the Conjoint Board of the R.C.P. Lond. and R.C.S.Eng. now grant diplomas in psychological medicine under conditions that are fairly comparable in the standard of the tests and in the duration of the courses; the details on these points can be obtained from the various examination bodies.

In London, courses of instruction for the Diploma in Psychological Medicine are given annually at the Maudsley Hospital, Denmark Hill, which has recently been definitely recognised as a school of the University of London. The course consists of two parts, commencing in January, and is adapted for the diploma of the Conjoint Board, the University of London, or the University of Cambridge. The parts may be taken separately; also during the year there are other short courses, lectures and demonstrations in psychological medicine.

Maudsley Hospital.—Appointments as clinical assistants are obtainable at the Maudsley Hospital. The holding of such appointments for varying periods satisfies the requirements of the different examining bodies in respect of practical study of mental disorders. The appointments and other facilities for clinical experience are open to qualified medical practitioners apart from the courses of instruction. Inquiries as to lectures should be addressed to the Director of the Central Pathological Laboratory, Maudsley Hospital, Denmark Hill, S.E.; and as to clinical facilities, to the Medical Superintendent at the same address.

Bethlem Royal Hospital.—A course of lectures and practical instruction for the Diploma in Psychological Medicine, granted by the various universities and the Conjoint Board, is held at Bethlem Royal Hospital, London, S.E., twice annually, during the spring and autumn. The fee for the full course is 15 guineas. Part A or Part B, however, may be taken separately at a fee of 10 guineas per part. In addition to the above, clinical instruction in Psychological Medicine is given at Bethlem Royal Hospital every morning (except Wednesdays) at 11 A.M. The fee for students is 3 guineas for a period of three months' attendance and for post-graduates a fee of 5 guineas for a like period. A reduction is made to those who attend the Diploma Course. House physicians are appointed at Bethlem Royal Hospital for a term of six months, which may be extended. These appointments are made on May 1st and Nov. 1st in each year and the vacancies are advertised in the medical papers. Apartments, complete board, attendance, and laundry are provided and also a salary at the rate of £100 per annum. Clinical assistants are often appointed from time to time for periods of three months or longer. These are non-salaried and non-resident posts, but partial board is provided. The Physician-Superintendent, Bethlem Royal Hospital, London, S.E., will supply further particulars.

University of Edinburgh.—Candidates for the Diploma in Psychiatry must be graduates in medicine and surgery of the University of Edinburgh or hold corresponding registrable degrees or qualifications of some other licensing body. Candidates are required subsequent to the date of graduation or obtaining a registrable qualification to have held (*a*) a resident appointment for one year in a hospital for mental disorders approved by the Faculty of Medicine, or alternatively (*b*) a six months' appointment as defined in (*a*) and six months' practical study of nervous diseases in a special or general hospital approved by the Faculty of Medicine. There are two examinations for the Diploma. Part I. comprises 1. Anatomy of the Nervous System. 2. Physiology of the Nervous System. 3. Psychology and Experimental Psychology. Part II. comprises: 1. Neuropathology. 2. Clinical Psychiatry. 3. Clinical Neurology. 4. An additional subject selected by the candidate from a prescribed list. The examinations are held twice yearly in March and July. Candidates who have held an asylum appointment for a period of five years or more may be exempted from the course of study in one or more subjects of the curriculum. Full particulars can be obtained from the Dean of the Faculty of Medicine.

Dublin University.—A post-graduate diploma in Psychological Medicine is conferred upon registered medical practitioners who have held a resident medical appointment at a recognised institution for the treatment of Mental Diseases for 12 months, or who

have held such an appointment for six months and have attended clinical instruction at an approved institution for six months. Candidates must also attend special courses of instruction and pass a special examination. Details can be obtained from the Registrar of the School of Physic, Trinity College, Dublin.

The National University of Ireland confers a diploma in Mental Diseases ; application should be made to the Registrars of the Constituent Colleges, University College, Dublin University College, Cork, and University College, Galway, for all information.

DIPLOMA IN OPHTHALMIC MEDICINE.

Special diplomas in ophthalmic medicine and surgery are issued by two examining bodies.

University of Oxford.—The diploma in ophthalmology (D.O.) is granted to registered medical practitioners after passing an examination, held annually in March, which is open to candidates who have pursued at Oxford a course of study in ophthalmology over a period of at least two months and who have attended a 12 months' recognised hospital course. Further information regarding these requirements may be obtained from the Dean of the School of Medicine.

Conjoint Board R.C.P. Lond., R.C.S. Eng.—The Conjoint Board grants the D.O.M.S. after an examination held in two parts, twice yearly in February and July. Part I. comprises anatomy and embryology of the visual apparatus, physiology of vision, and elementary optics. Part II. comprises optical defects, ophthalmic medicine and surgery, and pathology with special reference to ophthalmology. The examination in each case is written, oral, and practical or clinical. Candidates may only enter for Part II. on completion of a year of special study of ophthalmology after obtaining a registrable diploma or a Degree in Medicine and Surgery of a University recognised by the Board.

DIPLOMA IN MEDICAL RADIOLOGY AND ELECTROLOGY.

University of Cambridge.—The D.M.R.E. is open only to those who have held for at least one year a medical qualification approved by the Committee. The new regulations, which came into operation in October, 1928, in some respects materially alter the scope of the Diploma. The course now occupies nine months, beginning in October. The first three months, which can be spent either in Cambridge or in London, are occupied with lectures and practical work in Physics in preparation for the examination for Part I. in January, and an introductory course in Radiology and Electrology. The second three months must be spent in London. The course includes lectures and clinical instruction in Radiology and Electrology, with clinical practice in the radiological department of a hospital approved for that purpose by the Committee. The examination for Part II. is held in April. During the final three months a candidate must hold a clinical clerkship or similar appointment in a radiological department approved by the Committee, and must then present a thesis in the form of a critical report with notes upon six cases either in Radiology or in Electrology or in both these subjects, illustrating various methods of diagnosis or treatment. A number of large provincial hospitals have been approved by the Committee to take clinical assistants for this part of the course.

Further particulars as to courses and examinations may be obtained from G. Stead, M.A., Cavendish Laboratory, Cambridge, Secretary for the Diploma, or from Dr. A. E. Barclay, Department of Radiology, Medical School, Cambridge, or from Dr. Stanley Melville, British Institute of Radiology, 32, Welbeck-street, London, W. 1.

University of Liverpool.—Candidates before admission to the examination for this diploma must possess a registrable qualification, approved by the University in medicine and surgery, and must have attended courses of instruction in (*a*) physics (two terms), (*b*) (i) radiology, and (ii) electrology during six months in the X ray and electrotherapeutic departments of a hospital or hospitals. An examination is held in March each year, the subjects being (*a*) physics, (*b*) radiology and electrology. Examination in either part may be taken separately. Fees: tuition, £24 5*s.* ; examination and diploma, £6 5*s.* These courses commence during the first week in October. Application should be made to the Dean, Faculty of Medicine, the University of Liverpool.

University of Edinburgh.—Candidates for the Diploma in Radiology (D.R. Univ. Edin.) must be graduates in medicine and surgery of the University of Edinburgh or hold corresponding registrable degrees or qualification from some other licensing body. Candidates are not admitted to the examination for the Diploma until after the lapse of not less than one year from obtaining a registrable qualification, which qualification must be registered before admission to the Examination. The course of study begins in October and extends over a period of not less than three terms. The Examination, which is written, oral, and practical, is in two parts : (*a*) Physics, and (*b*) Radiology. The Examination is held twice yearly —viz., July and October.

Radiology can be taken as the special subject in the examination for Membership of the Royal College of Physicians of Edinburgh, which means that an Honours standard has to be attained. Full particulars may be obtained from the Dean of the Faculty of Medicine.

DIPLOMA IN LARYNGOLOGY AND OTOLOGY.

The Conjoint Board R.C.P. Lond., R.C.S. Eng., grants the D.L.O. after an examination held in two parts, twice yearly, in June and December. Part I. comprises anatomy, embryology, and physiology of the ear, nose, pharynx, larynx, trachea and bronchi, and œsophagus. Part II. comprises the medicine, surgery, and pathology of the ear, nose, pharynx, larynx, trachea and bronchi, and œsophagus, and the recognition and use of special instruments and appliances. The examination in each case is written, oral, and practical or clinical. Candidates may only enter for Part II. on completion of one year of special study of the diseases of the ear, nose, pharynx, and larynx, after obtaining a registrable qualification, or a degree in medicine and surgery of a University recognised by the Board. The fee for admission to each part is 6 guineas.

DIPLOMA IN TUBERCULOUS DISEASES.

A Diploma in Tuberculous Diseases is given by the University of Wales. The regulations governing the award of the diploma prescribe that every candidate must have obtained a registrable qualification in Medicine, Surgery, and Midwifery for at least two years before he can be admitted to the examination. He must have held, for not less than 12 months, a resident medical or surgical appointment on the staff of a Tuberculosis Hospital or Sanatorium, or at an Orthopædic Institution providing not less than one hundred beds for cases of surgical tuberculosis. A candidate whose resident appointment has been held at a Hospital, Sanatorium, or Institution receiving surgical cases of tuberculosis only, must produce a certificate of having attended a course of instruction in pulmonary tuberculosis extending over one term in the Welsh National School of Medicine, or an equivalent course of instruction extending over at least the same period in an institution approved by the University for this purpose. A candidate whose

resident appointment has been held at a Hospital, Sanatorium, or Institution for medical cases of tuberculosis only, must produce a certificate of having attended a course of instruction in non-pulmonary tuberculosis extending over one term in the Welsh National School of Medicine, or an equivalent course of instruction extending over at least the same period in an institution approved by the University for this purpose. Every candidate must have pursued a course of instruction in the epidemiology, pathology, and bacteriology of tuberculosis extending over one term in the Welsh National School of Medicine, or an equivalent course of instruction extending over at least the same period in an institution approved by the University for this purpose. The examination, which is held annually in the first week of June, is divided into two parts, and every candidate is required to satisfy the examiners in both parts at the same examination. Notice of candidature, together with the entrance fee of £10 10*s*., and the necessary certificates, must be forwarded to the Registrar of the University, University Registry, Cathays Park, Cardiff, not later than May 1st.

The Cecil Prosser Research Scholarship, of the value of £250 for one year, is awarded triennially for research in Tuberculosis.

DIPLOMA IN PUBLIC HEALTH.

THE following epitomises the instruction given at various universities and centres of medical education to medical men desiring to obtain diplomas in sanitary science, public health, hygiene or State medicine, as this discipline is variously called. Resolutions, designed with a view of ensuring "the possession of a distinctively high proficiency, scientific and practical, in all the branches of study which concern the public health," have been adopted at various times by the General Medical Council. The diploma is registrable by the Council, whose rules on the curriculum become binding on the educational bodies concerned. The new regulations, which came into force in 1924, extend the period of study and postpone the granting of a diploma until at least two years from qualification.

Conjoint Board of the R.C.P. Lond. and R.C.S. Eng. New regulations came into force on Jan. 1st, 1924, which apply to all candidates who have not commenced recognised study of Public Health in accordance with the above regulations before that date. They are as follows: The Examination consists of two Parts. Part I. will be held in the months of January, June, and October, and Part II. in the months of January, June, and October in each year. Candidates may enter for Parts I. and II. separately or at the same time, but they must pass Part I. before proceeding to Part II. The Examination in each part will be written, oral, and practical. Part II. will include a practical examination in Infectious Diseases, Food Inspection, and Inspection of selected Premises. Candidates who fail to satisfy the Examiners in either part may present themselves again at the next Examination on payment of the same fees. Candidates intending to present themselves for either part of the Examination must give 14 days' notice in writing to the Secretary, at the Examination Hall, Queen-square, London, W.C. 1.

Candidates will be admissible to Examination in Part I. on producing evidence:—

1. Of being in possession of a registrable qualification in Medicine, Surgery, and Midwifery.

2. Of having attended during a period of not less than five months at an Institution recognised by the Examining Board in England, practical instruction in (*a*) Bacteriology and Parasitology (including Medical Entomology) especially in their relation to diseases of man and to those diseases of the lower animals which are transmissible to man, during 180 hours, of which not less than 150 hours have been occupied in practical laboratory work. (*b*) Chemistry and Physics in relation to public health, during 90 hours, of which not less than 70 hours have been occupied in practical laboratory work. (*c*) Meteorology and Climatology in relation to public health, during not less than 10 hours.

Candidates will be admitted to Part II. of the Examination on producing evidence:—

1. Of having been in possession of a registrable qualification in Medicine, Surgery, and Midwifery during not less than two years, of being registered by the General Medical Council, and of having completed the curriculum for the Diploma extending over a period of 12 calendar months subsequent to the attainment of a registrable qualification.

2. Of having attended, after obtaining the registrable Qualification, instruction during not less than 80 hours at an Institution recognised by the Examining Board in England in the following subjects:—(*a*) The Principles of Public Health and Sanitation for not less than 30 hours; (*b*) Epidemiology and Vital Statistics for not less than 20 hours; (*c*) Sanitary Law and Administration (including Public Medical Services) during not less than 20 hours; (*d*) Sanitary Construction and Planning during not less than 10 hours.

3. Of having attended for three months the clinical practice of a hospital for infectious diseases recognised by the Examining Board in England and of having therein received instruction in the methods of administration. The certificate must state that the candidate has attended on one or more days in each week of the three months, that each attendance was of two hours' duration, with a total attendance of 60 hours.

4. Of having been engaged during a period of not less than six months in acquiring a practical knowledge of the duties, routine and special, of public health administration under the supervision of a Medical Officer of Health, and of having received, from such officer or other competent Medical Officer during not less than three hours on each of 60 working days, practical instruction in those duties and also those relating to: (*a*) Maternity and Child Welfare Service; (*b*) Health Service for children of school age, (*c*) Venereal Diseases Service; (*d*) Tuberculosis Service; (*e*) Industrial Hygiene; (*f*) Inspection and Control of Food; including meat and milk.

The above certificate (4) must be obtained from a Medical Officer of Health who devotes his whole time to public work, or from a Medical Officer of Health of a Sanitary Area having a population of not less than 50,000, or in Ireland the Medical Superintendent Officer of Health of a County or County Borough having a population of not less than 50,000.

University of Oxford.—The examinations for Diplomas in Public Health have been suspended until further notice.

University of Cambridge.—Two examinations in so much of State medicine as is comprised in the functions of medical officers of health are held during the year. The examination is divided into two parts and demands proficiency in all the branches of study which bear upon the duties of medical officers of health. The examinations in both parts will be oral and practical, as well as in writing. Candidates may present themselves for either part separately; but the result of the examination in the case of any candidate will not be published until he has satisfied the examiners in both parts. Marks of distinction will be placed against the names of candidates who have specially distinguished themselves in either (1) Part I. of the examination; or (2) Part II. of the examination. Candidates must before admission to either part of the examination produce evidence of having satisfied the regulations applicable to Part I. and Part II. The examination for Part I. is in April and for Part II. in October.

For Part I. of the examination courses of lectures and laboratory instruction are given in the University on Hygiene, Chemistry, &c., and on Bacteriology and Parasitology. For Part II. the Medical Officer of Health for Cambridge gives courses on Practical Sanitary Administration and in the Administrative Methods of the Infectious Diseases Hospital; and the Medical Officer of Health to the Cambridgeshire County Council, on Sanitary Laws, School Hygiene, Epidemiology. There are also courses by special lecturers in Vital Statistics, Tuberculosis Service, Venereal Diseases Service, Industrial Hygiene, Maternity and Child Welfare. These courses are open to non-members of the University.

A special Diploma in Hygiene is granted to medical graduates whose qualifications are not registrable in England. The courses and examinations are the same as for the Diploma in Public Health (except that the candidates are not examined in English Sanitary Laws).

All applications for further information respecting examinations and the courses of study should be addressed to Mr. Purvis, Public Health Chemical Laboratory, Cambridge.

University of London.—Candidates for the M.D. Degree may offer State Medicine as a subject in which to graduate. The regulations have been revised and may be obtained on application to the Academic Registrar, University of London, South Kensington.

University of Durham.—The Degree of Bachelor of Hygiene (B.Hy.) and the Diploma in Public Health (D.P.H.).—No candidate is admitted to the final examination for the Degree of B.Hy. unless he is a Bachelor of Medicine and Surgery, of not less than two years' standing, of a recognised University whose degrees are registrable on the books of the General Medical Council of the United Kingdom, and no candidate is admitted to the final examination for the D.P.H. unless he is a registered medical practitioner, of not less than two years' standing. The course of study for the B.Hy. and D.P.H. extends over a period of not less than 12 calendar months, subsequent to the attainment of a qualification registrable by the General Medical Council of the United Kingdom. Candidates for the B.Hy. must attend this course at the University of Durham; candidates for the D.P.H. may attend it at the University of Durham, or at any medical school or institution which is recognised by the University. The examination for the diploma or degree is divided into two parts. A candidate must pass in all the subjects of Part I. before being admitted to examination for Part II. In Part I., and also in Part II., a candidate must pass in all the specified subjects at one time. The examination for Part I. is practical, written, and oral, and includes the following subjects: Bacteriology and Parasitology (including medical entomology); Chemistry and Physics, and Meteorology and Climatology, in relation to Public Health. Candidates are not admitted to examination for Part I. until after they have completed the prescribed courses of instruction in the subjects thereof. The examination for Part II. includes Hygiene and Sanitation (comprising sanitary construction), Epidemiology and Infectious Diseases; Sanitary Law and Vital Statistics; Public Health Administration. The examination is written and oral, and includes practical examinations in Infectious Diseases, Food Inspection, Inspection of Premises—Dwellings, Factories, Workshops, Schools, &c. Candidates are not admitted to examination for Part II. until after they have completed the prescribed courses of instruction in the subjects thereof. Doctor of Hygiene (D.Hy.): Candidates must be Bachelors of Hygiene of the University of two years' standing, and are required to satisfy the examiners that they have conducted original research in the subject of Public Health.

University of Birmingham.—Under the rules and regulations of the General Medical Council the University grants a degree of B.Sc. in Public Health and also a Diploma in the same subject on the following conditions: Graduates in Medicine of this University may become candidates for the degree of Bachelor of Science in Public Health by conforming to all the requirements laid down for candidates for the Diploma in Public Health, except that after graduating in Medicine all courses of study must be taken out in the University, and they must, in addition, have attended a three months' course of Geology in the University. A Thesis on the Ætiology and Prevention of a Disease of which the candidate has made a special study must be submitted on entry for B.Sc. Part II. The examinations will be held in the months of March and October, and will consist of two parts, each part being written, oral, and practical. No candidate will be allowed to pass Part II. until he has passed Part I. Candidates may enter for Parts I. and II. separately or at the same time. The fee for each part of the examination is £6 5*s*. Medical Officers of the Royal Navy who have attended the required course of study at the Naval Medical School, Greenwich, will be admitted to Part I. examinations for the Diploma in Public Health, whether they have previously been students at the Birmingham School or not; and the same applies to officers of the Royal Army Medical Corps who have studied at the Staff College. Medical Officers of the Navy and Army are admitted to Part II. Examination (D.P.H.) on complying with the requirements laid down for attendance upon Courses of Study. These Courses need not necessarily be attended in the University of Birmingham.

University of Liverpool.—The University grants a Degree in Hygiene (M.H.) and a Diploma (D.P.H.), and every facility is afforded for training in Sanitary Science and State Medicine. The curriculum for the Degree extends over a period of two years, the first of which is devoted to laboratory instruction and practical classes (including those for the Diploma); the second being devoted to advanced study and research. The courses may be taken at any time, and students are allowed to work daily in the laboratories.

University of Leeds.—The University grants a Diploma in Public Health, and every facility is afforded for training in Sanitary Science and State Medicine. The examination, which is held twice in each year—namely, in June and December—is in two parts, and is written, oral, and practical. Candidates must pass in Part I. before being admitted to Part II. Instruction in Entomology and Meteorology is given in the first term, and in Sanitary Chemistry and Bacteriology in the second and third terms. Practical work under arrangement with the Leeds City Council. Prospectus can be obtained from the Academic Sub-Dean of the Medical School.

University of Bristol.—Diploma in Public Health. Candidates must be at least 23 years of age, shall be fully registered medical practitioners of not less than two years' standing as such, and shall have passed the examination prescribed by regulations, which can be obtained from the Registrar upon application.

University of Wales.—Candidates for the Diploma in Public Health, the curriculum for which extends over a period of not less than twelve calendar months subsequent to the attainment of a registrable qualification, must produce evidence of having attended for not less than five months at the Welsh National School of Medicine or at an institution approved by the Court, practical instruction in Bacteriology and Parasitology, Chemistry and Physics, and Meteorology and Climatology in relation to Public Health. Candidates must also satisfy the examiners that they have received instruction approved by the University in the Principles of Public Health and Sanitation, Epidemiology and Vital Statistics, Sanitary Law and Administration, and Sanitary Construction and Planning. The candidate must also produce evidence that he has attended for three months on the clinical practice of a hospital for infectious diseases containing not less than 100 beds, and has received therein instruction in the methods of administration, and that he has for a period of not less than six months been engaged in acquiring a practical knowledge of the duties, routine and special, of a public health administration under the supervision of a medical officer of health. The examination for the diploma is divided into two parts, Part I. and Part II., each of which extends over not less than two days. A candidate must pass in all the subjects of Part I. before being admitted to Part II. of the examination. In Part I., and also in Part II., a candidate must pass in all the specified subjects at one time. Part I. of the examination is practical, written and oral, and comprises

Bacteriology and Parasitology (including Medical Entomology); Chemistry and Physics, and Meteorology and Climatology in relation to Public Health. Candidates may not be admitted to Part I. of the examination until they have been certified as having pursued the prescribed courses of instruction in the subjects thereof. Part II. of the examination, which is written and oral, comprises: Hygiene and Sanitation (including Sanitary Construction); Epidemiology and Infectious Diseases; Sanitary Law and Vital Statistics; Public Health Administration. No candidate can be admitted to Part II. of the examination until after the lapse of not less than two years from the date of his obtaining a registrable qualification in Medicine, Surgery, and Midwifery, which qualification must be registered before admission to Part II. of the examination. An examination in each part will be held annually. The examination in Part I. will be held in June, that in Part II. in October. Full information from the Registrar of the University, University Registry, Cathays Park, Cardiff, not later than May 15th for the examination in Part I. and not later than Sept. 1st for the examination in Part II.

University of Edinburgh.—Candidates for the Diploma in Public Health must be graduates in medicine and surgery of the University, or hold corresponding degrees or registrable medical qualifications which must be registered before admission to examination. The course is divided into two parts for which examinations are held twice yearly, in March and July for Part I., and in October and March for Part II. In each part the candidate must pass in all the specified subjects at one examination. Candidates are not admitted to Part II. until they have passed Part I., nor until after the lapse of not less than two years from the date of obtaining a registrable medical qualification. The subjects of the examination are: Part I. (written, oral, and practical), Bacteriology; Medical Entomology and Parasitology; Chemistry, Physics, Meteorology, and Climatology. Part II. (written, oral, and practical), Hygiene, Sanitation, and Sanitary Construction; Epidemiology and Infectious Diseases; Sanitary Law and Vital Statistics; Public Health Administration. There is also included practical examinations in Infectious Diseases, Food Inspection, and Inspection of Premises. The course, which extends over a period of 12 calendar months, begins in October, and provision is made by the University for instruction in all the subjects. Detailed particulars may be obtained from the Dean of the Faculty of Medicine.

University of Aberdeen.—Every candidate for the Diploma in Public Health must be a graduate in medicine of the University of Aberdeen, or of any other University whose medical degrees are recognised as qualifying for registration by the General Medical Council of the United Kingdom. No candidate will be admitted to the Final Part of the Examination for the Diploma until after the lapse of not less than two years from the date of his obtaining a registrable qualification in Medicine, which qualification shall have been registered before such admission. The whole of the prescribed curriculum of study must be undertaken after the candidate has obtained a registrable qualification in medicine, and shall extend over not less than twelve calendar months. At least one academic term must be spent at the University of Aberdeen. Every candidate shall produce evidence of having complied with the following requirements in respect of study and training:—1. Practical instruction in the following subjects within a laboratory or laboratories approved by the University: (*a*) Bacteriology and Parasitology (including Medical Entomology), in relation to diseases of man and diseases of lower animals transmissible to man—at least 180 hours, of which not less than 150 shall be occupied in practical laboratory work; (*b*) Chemistry and Physics, in relation to Public Health—at least 90 hours, of which not less than 70 shall be occupied in practical laboratory work; (*c*) Meteorology and Climatology, in relation to Public Health—at least 10 hours; such instruction to extend over not less than five months or two academic terms. 2. A course or courses of instruction extending over not less than 80 hours dealing with: (*a*) The Principles of Public Health and Sanitation—30 hours; (*b*) Epidemiology and Vital Statistics—20 hours; (*c*) Sanitary Law and Administration (including Public Medical Services)—20 hours; (*d*) Sanitary Construction and Planning—10 hours; such course or courses to be given at an institution or by a teacher or teachers approved by the University. 3. Practical instruction, clinical and administrative, within a recognised hospital for general infectious diseases; such instruction to extend over three months, and to include 30 daily attendances of not less than two hours in each week. 4. Practical instruction and experience, during not less than six months (including attendance of at least three hours on each of sixty working days) in the duties, routine and special, of public health administration, under the supervision of a medical officer of health, who shall certify that the candidate has received from this officer or other competent medical officer, practical instruction in these duties, and also in those relating to: (*a*) Maternity and Child Welfare Service; (*b*) Health Service for Children of School Age; (*c*) Venereal Diseases Service; (*d*) Tuberculosis Service; (*e*) Industrial Hygiene; (*f*) Inspection and Control of Food, including meat and milk. The medical officers of health recognised for this purpose by the General Medical Council are: (*a*) a medical officer of health who devotes his whole time to public health work; or (*b*) the medical officer of health of a sanitary area having a population of not less than 50,000; or (*c*) in Ireland, the medical superintendent officer of health of a county or county borough having a population of not less than 50,000. The examination for the diploma is divided into two parts, each of which extends over not less than three days.

University of Glasgow.—Degree of B.Sc. in Public Health.—Candidates must be graduates in Medicine of a University of the United Kingdom, or of some other University recognised for the purpose by the University Court. Candidates must produce evidence (1) that, after they have obtained a registrable Degree in Medicine, a period of not less than two years has elapsed; (2) that, after they have obtained a registrable degree in Medicine, they have, during a period of not less than 21 calendar months, pursued the course of work and instruction prescribed, and have satisfied the examiners in the prescribed examinations. There are two examinations. Part I. includes the following subjects: (i) Bacteriology and Parasitology (including Medical Entomology); (ii) Chemistry and Physics in relation to Public Health; (iii) Meteorology and Climatology in relation to Public Health; (iv) Higher Chemistry in relation to Public Health; (v) Physics and Geology. A candidate must pass in the subjects marked (i), (ii), and (iii) of Part I. at one examination. Part II. includes the following subjects: (vi) Hygiene and Sanitation (including Sanitary construction); (vii) Epidemiology and Infectious Diseases; (viii) Sanitary Law and Vital Statistics; (ix) Public Health Administration; (x) Applied Hygiene. The examination for Part II. includes practical examinations in Infectious Diseases; Food Inspection; Inspection of Premises, such as dwellings, factories, workshops, schools, and the like. The examination in Applied Hygiene may be on a selected subject professed by the candidate. A candidate must pass in the subjects marked (vi), (vii), (viii), and (ix) of Part II. at one examination. *Diploma in Public Health (D.P.H.).*—Candidates for this Diploma must be legally qualified medical practitioners who are matriculated students of the University. A period of not less than two years must elapse between the attainment by the candidate of a registrable medical qualification, and his admission to the final examination (Part II.) for the Diploma. The candidate must,

during a period of not less than 12 calendar months, subsequent to his attainment of a registrable medical qualification, pursue the course of work and instruction prescribed, and pass the prescribed examinations. The examination, which is both written and oral, is divided into two parts, Part I. and Part II., each of which extends over not less than two days. No candidate is admitted to either part of the examination until he has completed the prescribed courses of instruction in the subjects of that part. No candidate is admitted to Part II. until he has passed in all the subjects of Part I., nor until after the lapse of not less than two years from the date of his obtaining a registrable medical qualification, nor unless he presents a certificate showing that his name and qualification have been duly registered in the Medical Register. Part I. includes: (i) Bacteriology and Parasitology (including Medical Entomology); (ii) Chemistry and Physics in relation to Public Health; (iii) Meteorology and Climatology in relation to Public Health. A candidate must pass in all the subjects at one examination. Part II. includes: (iv) Hygiene and Sanitation (including Sanitary Construction); (v) Epidemiology and Infectious Diseases; (vi) Sanitary Law and Vital Statistics; (vii) Public Health Administration. A candidate must pass in all the subjects at one examination. The examination for Part II. includes practical examinations in Infectious Diseases; Food Inspection; Inspection of Premises, such as dwellings, factories, workshops, schools, and the like.

University of St. Andrews. — The Diploma in Public Health is open to those who hold a registered medical qualification of the United Kingdom. The examination is in two parts. (1) (*a*) Bacteriology and Parasitology; (*b*) Chemistry and Physics; (*c*) Meteorology and Climatology. (2) Public Health and Sanitation, Epidemiology and Vital Statistics, Sanitary Law and Administration, and Sanitary Construction and Planning. Before admission to the first examination the candidate must have held his medical qualification for one year, and before admission to the second examination for two years. Graduates in Medicine of the University of St. Andrews may take part or all of the qualifying classes in any University of the United Kingdom, or in any Indian, Colonial, or Foreign University or medical school recognised by the University Court, but holders of other registered medical qualifications must spend at least eight out of the 12 months' curriculum in St. Andrews University. A complete course is given in the Conjoint Medical School, Dundee. The examination fee for each division is £5 5*s*.

University of Dublin (*Trinity College*).—The Diploma in Public Health is conferred, after examination, under the following conditions. The candidate must be a registered medical practitioner and have obtained a registrable qualification at least two years before the second part of the examination. The candidate must have completed, subsequently to obtaining a registrable qualification, five months' practical instruction in a chemical and bacteriological laboratory, or laboratories, approved by the University, must have received instruction in the following subjects: the principles of public health and sanitation, epidemiology and vital statistics, sanitary law and administration (including public medical services), sanitary construction and planning; must have studied, practically, outdoor sanitary work for six months under an approved officer of health, and must have attended for three months at a fever hospital where opportunities are afforded for the study of methods of administration. A special prospectus may be obtained by application to the Registrar of the School of Physic, Trinity College, Dublin.

National University of Ireland.—At this University there is a Diploma in Public Health, a B.Sc. in Public Health, and a D.Sc. in Public Health.

University of Belfast.—A Diploma in Public Health is given by examination. Every candidate must produce evidence that, after obtaining a registrable qualification, he has during six months received practical instruction in an approved laboratory in which Chemistry, Bacteriology, and the Pathology of the diseases of animals transmissible to man are taught. After obtaining a registrable qualification every candidate must produce evidence that he has attended during three months the practice of a hospital for infectious diseases at which opportunities are afforded for the study of methods of administration. The examination must have extended over not less than four days, one of which shall have been devoted to practical work in a laboratory, and one to practical examination in, and reporting on, subjects which fall within the special outdoor duties of a medical officer of health. The first part of the examination will have reference to the general principles of Sanitary Science and the second part to State Medicine and to the applications of Pathology and Sanitary Science. The examination in both parts is held twice a year, in March and June.

Royal College of Physicians of Edinburgh, Royal College of Surgeons of Edinburgh, Royal Faculty of Physicians and Surgeons of Glasgow.—All candidates for the Diploma in Public Health must have a qualification which has been registered under the Medical Acts. The examination is divided into two parts. For Part I. the candidate must produce evidence of having received during a period of not less than five months at an institution recognised by the Board practical instruction in: (*a*) Bacteriology and Parasitology (including Medical Entomology), especially in their relation to diseases of man and to those diseases of the lower animals which are transmissible to man, during 180 hours, of which not less than 150 hours have been occupied in practical laboratory work; (*b*) Chemistry and Physics in relation to Public Health during 90 hours, of which not less than 70 hours has been occupied in practical laboratory work; (*c*) Meteorology and Climatology in relation to Public Health during not less than 10 hours. For Part II. evidence must be given of having received instruction during not less than 80 hours in: (*a*) The Principles of Public Health and Sanitation for not less than 30 hours; (*b*) Epidemiology and Vital Statistics for not less than 20 hours; (*c*) Sanitary Law and Administration (including Public Medical Services) during not less than 20 hours; (*d*) Sanitary Construction and Planning during not less than 10 hours; of having attended for three months the clinical practice of a recognised hospital for infectious diseases; and of having been engaged during a period of not less than six months in acquiring a knowledge of Public Health administration in addition to practical instruction in the duties relating to: (*a*) Maternity and Child Welfare Service; (*b*) Health Service for Children of School Age; (*c*) Venereal Diseases Service; (*d*) Tuberculosis Service; (*e*) Industrial Hygiene; (*f*) Inspection and Control of Food, including meat and milk. The fee is 12 guineas for both examinations, or 6 guineas for either of them. A fee of 6 guineas is payable by rejected candidates for either examination. The examination is held twice yearly, in March in Glasgow, and October in Edinburgh. The published regulations provide detailed synopses of the subjects of examination. The Registrar for Edinburgh is Dr. David Thomson, 49, George-square, and for Glasgow, Mr. Walter Hurst, 242, St. Vincent-street.

Royal College of Physicians of Ireland and Royal College of Surgeons in Ireland.—Every candidate for the Diploma in Public Health must observe the following rules: 1. A period of not less than two years shall elapse between the attainment by a candidate of a registrable qualification in Medicine, Surgery, and Midwifery, and his admission to the Final Examination for a Diploma in Public Health. 2. The curriculum for a Diploma

in Public Health shall extend over a period of not less than 12 calendar months subsequent to the attainment of a registrable qualification. 3. Every candidate shall produce evidence of having attended, during a period of not less than five months, at an institution approved by the Licensing Body granting the Diploma, practical instruction in—(*a*) Bacteriology and Parasitology (including Medical Entomology), especially in their relation to diseases of man, and to those diseases of the lower animals which are transmissible to man; (*b*) Chemistry and Physics in relation to Public Health; (*c*) Meteorology and Climatology in relation to Public Health. At least 180 hours must be devoted to Course (*a*), of which not less than 150 hours shall be occupied in practical Laboratory work. At least 90 hours must be devoted to Course (*b*), of which not less than 70 hours shall be occupied in practical Laboratory work. At least 10 hours must be devoted to Course (*c*). 4. Evidence of having received, during not less than 80 hours, at an institution or from teachers approved by the Licensing Body granting the Diploma, instruction in the following subjects: (*a*) The Principles of Public Health and Sanitation; (*b*) Epidemiology and Vital Statistics; (*c*) Sanitary Law and Administration (including Public Medical Services); (*d*) Sanitary Construction and Planning. 5. Evidence that he has attended for three months on the clinical practice of a recognised Hospital for Infectious Diseases. 6. Evidence that he has, during a period of not less than six months, been engaged in acquiring a practical knowledge of the duties, routine and special, of Public Health Administration under the supervision of a Medical Officer of Health. The examination for the Diploma is divided into two parts. The examination for Part I. includes Bacteriology and Parasitology (with Medical Entomology); Chemistry and Physics, and Meteorology and Climatology, in relation to Public Health. The examination for Part II. includes Hygiene and Sanitation (with Sanitary Construction); Epidemiology and Infectious Diseases; Sanitary Law and Vital Statistics; Public Health Administration. The examination, which is written and oral, includes practical examinations in Infectious Diseases; Food Inspection; Inspection of Premises—dwellings, factories, workshops, and schools.

PRISON MEDICAL SERVICE.

CANDIDATES for the Prison Medical Service are approved by the Secretary of State for the Home Department on the recommendation of the Prison Commissioners. Preference is always given to candidates who have experience of lunacy. Application for employment may be made on a special form, which can be obtained from the Secretary, Prison Commission, Home Office, London, S.W. In the smaller prisons the medical officership is part-time, and is usually filled by practitioners in the locality, preference being given to those who have special experience of lunacy. In the large prisons the medical staff must devote their whole time to the Service. In the case of whole-time service, the appointment is in the first instance to the post of Medical Officer, Class II., and from this rank the Medical Officers, Class I., are selected as vacancies occur. The pay of the whole-time prison medical staff is as follows: Medical Officer, Class II., £350, rising by annual increments of £20 to £600, making the pay at present with bonus £485 8*s*. to £776 7*s*.; Medical Officer, Class I., £650, rising by annual increments of £25 to £800, plus bonus, making the pay £837 5*s*. to £995 11*s*. Unfurnished quarters are provided or an allowance in lieu is made. Study-leave is granted annually to two of the whole-time Medical Officers. There are 12 full-time medical officers of Class I. and 15 Class II., and 23 part-time medical officers. The number of vacancies is never large and promotion is slow.

DENTAL SURGERY.

REGISTRATION on the Medical Register entitles a practitioner to practise as a dentist, although he cannot register as such without degree or licence in dentistry; but few dental appointments at general or special hospitals or dispensaries are available save to those with a special diploma, and, until registered on the Dentist Register, no dental work under the Additional Benefit Scheme of the National Health Insurance Act can be undertaken.

The Examining Bodies in Dentistry which grant degrees and diplomas in the subject are as follows: Royal College of Surgeons of England, Royal College of Surgeons, Edinburgh, Royal Faculty of Physicians and Surgeons of Glasgow, Royal College of Surgeons in Ireland, and the following Universities: Birmingham, Bristol, Durham, Leeds, Liverpool, London, Manchester, Sheffield, St. Andrews, Dublin (Trinity College), Queen's University of Belfast, and the National University of Ireland. The respective requirements of the various examining bodies in dentistry are very similar, being designed to meet the requirements of the General Medical Council, but the examinations vary in stringency, and each school has its rules for matriculation and exemption, and its scale of fees. The student should apply to the secretaries of the various Conjoint Boards or to the Deans of the medical faculties or medical schools for a syllabus.

TEACHING INSTITUTIONS IN DENTISTRY: LONDON.

Royal Dental Hospital of London, School of Dental Surgery, Leicester-square.—A school of the University of London. Women are admitted as students and are eligible for all hospital appointments and school prizes. The school provides the special dental education required by the University of London for the B.D.S. Degree and the Royal College of Surgeons for the Licence in Dental Surgery. The general part of the curriculum may be taken at any general hospital. The hospital is open from 9 A.M. to 5 P.M., there being one staff for the morning and another for the afternoon of each day. Pupils are received for the training in dental mechanics recognised by the curriculum. The instructors at the commencement of each session give a course of lectures on Operative Dental Surgery. The five house surgeoncies are held for four months each and are open to all qualified students. The lecturers, in addition to their lectures, give special demonstrations on the Microscopy of Dental Anatomy and Dental Surgery. The lecturer on Dental Mechanics also gives practical demonstrations in the laboratory. There is an Entrance Scholarship in Chemistry and Physics of the value of £25. One Entrance Scholarship in Dental Mechanics and Metallurgy, value £25. Prizes and certificates are awarded by the lecturers for the best examinations in the subjects of their respective courses at the end of the summer and winter sessions. For full information as to scholarships and prizes, and other matters connected with the course, application should be made to the Dean.

University College Hospital Dental School, corner of Great Portland and Devonshire-streets, W.—This Hospital and School has recently been thoroughly reorganised, and is now fully equipped with all the most modern appliances. Students are entered as students of University College Hospital, and, as such, attend the classes of Anatomy and Physiology in University College, which is a few minutes' walk from the Dental Department in Great Portland-street, hitherto known as the *National Dental Hospital*, the first Dental School to admit Women Students. Practical courses to comply with the R.C.S. curriculum are held. Clinical Lectures and Demonstrations are given, and each student on entering passes through a preliminary course under a demonstrator. A prospectus containing full information as to lectures,

fees, and prizes may be had on application to the Sub-Dean for Dental Students, who attends at University College Hospital Medical School, University street, W.C.1, on Wednesday mornings from 9.30 to 10.30, and at other times by appointment.

Guy's Hospital Dental School.—The work of the Dental Department begins daily at 9 A.M. both in the extraction rooms and in the conservation room. The Extraction Rooms: There is ample accommodation for both general and local anæsthetic extractions, together with waiting- and retiring-rooms. Patients are admitted between 8.45 and 9.30 A.M., and are seen by the dental surgeon for the day, the staff demonstrators, the dental house surgeons, and the dressers. The Conservation Room is open from 9 A.M. till 5 P.M. It affords accommodation for about 100 dental chairs, with the necessary equipment of the most modern type for the use of the Dressers, who, under the supervision of the Staff, perform the various operations of Dental Surgery. There is a separate room for denture patients affording accommodation for 15 chairs and a separate department for children with accommodation for 20 chairs. The Members of the staff attend every morning and afternoon to give demonstrations and otherwise assist students in their work in the Conservation Room and Prosthetic Laboratory. The Probationers' Laboratory is supervised by three of the staff demonstrators, and instruction is given in operative dentistry on a "mannikin" to students during their first three months of clinical study. Students in Dental Prosthetics are received, and a graded, systematic, and full course of instruction, extending over two years, is carried out under the supervision of the Director of the Prosthetic Laboratory, assisted by two demonstrators, a house surgeon, and five mechanics.

Dental students have the opportunity of attending at this hospital the whole course of instruction required by the examining board for the B.D.S. Lond. or L.D.S. Eng.—viz., the complete course in dental prosthetics, the special lectures and practice of the Dental Department, and the general lectures and practice of the Medical School. Students who enter for a medical as well as a dental course are allowed to pursue their study of Dentistry during any period of their medical course most convenient to themselves without further charge.

Twelve house surgeons, 20 assistant house surgeons, and four student demonstrators of Dental Histology are appointed annually. The following appointments are held by students: Full surgeon's dresser, assistant surgeon's dresser, dresser in the children's department, casualty dresser, clerk to the anæsthetist, dresser in the gas extraction and local anæsthetic extraction rooms, and probationary dresser. For particulars as to scholarships and prizes, as well as all information, application should be made to the Dean of the Medical School, Guy's Hospital, London Bridge, S.E. 1.

King's College Hospital.—The Dental School is part of the Medical School of King's College Hospital, and was opened in November, 1923. The Dental Out-patient Department of the Hospital is used for the performance of dental extractions. A large Conservation Room with provision for 40 dental chairs has been equipped. Smaller rooms are used for clinical teaching and administrative requirements, and a specially equipped laboratory for training in the art of dental mechanics. An X ray apparatus has been installed for special use in dental skiagraphy. A museum containing a large number of specimens illustrating oral, buccal, dental, and other diseases is available for teaching purposes. The library, lecture theatre, lecture rooms, common rooms, and the refreshment room are all available for the use of students. Courses of study, including practical work, are provided for the degree of Bachelor of Dental Surgery of the University of London, and for the Diploma in Dental Surgery of the Royal College of Surgeons of England. Special arrangements are made for those students who wish to take a medical degree or qualification in addition to a degree or diploma in Dental Surgery.

The following salaried appointments are open to qualified members of the School: Registrar, Resident House Surgeon, Non-Resident House Surgeon, and Tutors in Dental Mechanics, Orthodontics, and Dental Materia Medica.

Full particulars of the Dental School may be obtained on application to the Dean, or to the Secretary of the Medical School, King's College Hospital, Denmark Hill, London, S.E.

London Hospital.—This school is a part of the London Hospital and Medical College, and is fully equipped on the most modern lines and with the latest appliances. It provides a complete curriculum in all subjects for the B.D.S. Degree and for the L.D.S. Diploma, and is admirably adapted for the purpose of teaching. The Conservation Room is well lighted and ventilated and fitted with pump chairs of the latest pattern; the fountain spittoons at many of the chairs have been specially designed. Each spittoon has attached to it a saliva ejector, hot and cold water, compressed air, gas and electric current, also a swing bracket to carry the students' cabinet. Electric sterilisers are supplied in each department and motor engines where required. The School possesses, in addition to the Theatres, Laboratories, and Museums in the College, a special Museum of Dental Anatomy and Surgery, Operative Dentistry, Prosthetic and Extraction Rooms, and Laboratories for Practical Metallurgy and Prosthesis. A systematic course of instruction is arranged for pupils. The up-to-date Laboratory contains every modern apparatus and is in charge of a skilled curator and his assistants. Connected with the Medical College and Dental School are a Library, Athenæum, Clubs' Union, Dining Hall with moderate tariff, Students' Hostel, and an Athletic Ground. For full particulars as to Scholarships and Prizes, fees and course of study advised, apply to the Dean of the Medical School.

London (Royal Free Hospital) School of Medicine for Women.—Full courses are arranged for women students for the study of dentistry and in preparation for the B.D.S. Degree of the University of London and the Licence in Dental Surgery of the Royal College of Surgeons of England, at the London (Royal Free Hospital) School of Medicine for Women. The Eastman Dental Clinic will, when completed, provide a Dental School for women students; in the meantime the course for dental students is arranged in conjunction with the Royal Dental Hospital.

Teaching Institutions Outside London.

Birmingham Dental Hospital, Great Charles-street.—Dean: Cyril Howkins, C.B.E., D.S.O., M.R.C.S., L.D.S. The Dental Hospital has accommodation for 100 students. The equipment is in accordance with the most modern requirements for the efficient teaching and practice of Dental Surgery, including Radiology and Ultra-Violet Ray Therapy and a new department for Practical Pathology and Bacteriology. The operations performed annually average 35,000, including gold and other fillings, crowns, bridges, porcelain inlays, and injections for block and infiltration anæsthesia. The orthodontic department is one of the foremost in the country. The Prosthetic and Mechanical Department is large and well lighted and under a highly skilled instructor who is always present. Application for information as to fees and scholarships must be sent to the Dean of the Medical Faculty, Birmingham University, or the Dean of the Dental Hospital, Birmingham.

Leeds University School of Dentistry.—The School of Dentistry is adequately equipped to provide for the complete training of the dental student. It forms a part of the Leeds School of Medicine whilst the instruction in clinical and mechanical dentistry is

carried out in the Dental Hospital. The School is now in occupation of a spacious new building especially designed to the requirements of modern dental teaching. The School is also the dental department of the General Infirmary, and its close association with the work of that institution ensures an adequate supply of clinical material, and enables a fuller insight into the position dental surgery holds in relation to general medicine and surgery, especially with regard to the major diseases and injuries of the head and neck. The courses of study are mainly designed to meet the requirements of the B.Ch.D. and L.D.S. Leeds, but every opportunity is afforded to students preparing for the degrees or diplomas of other licensing bodies. Full-time demonstrators give the instruction in clinical dental surgery, prosthetic dentistry, and mechanics, which is carried out under the supervision and direction of members of the Honorary Staff, two of whom are in attendance each day. Special facilities are provided for instruction in Orthodontia, Dental Radiography, Local and General Anæsthetics. Prizes are offered for competition to pupils and students in their respective years of study. Communications should be addressed to the Warden, School of Dentistry, Leeds, from whom a prospectus may be obtained.

Dental Hospital of Manchester.—This hospital is in association for teaching purposes with the University of Manchester and the Royal Infirmary, and is in the centre of a very large population. Courses of study are provided to meet the requirements of the various examining bodies, including those of the University of Manchester for the qualifications L.D.S. and B.D.S., and the L.D.S. of the Royal College of Surgeons of England. Clinical instruction is given in Dental Prosthetics, Operative Dentistry, Diagnosis and Extraction, Orthodontics, Dental Surgery, Radiography, and Anæsthetics by specially appointed Clinical Teachers.

All the courses of instruction are open to women students. Copies of the Prospectus will be forwarded on application to Mr. J. Hilditch Mathews, Dean.

Newcastle-upon-Tyne Dental Hospital and School.—This hospital is centrally situated (within five minutes of the various colleges, infirmary, and railway station); the rooms are well lighted and thoroughly equipped for carrying on the work. Dental surgeons and an anæsthetist attend each morning. A tutorial dental surgeon is also in attendance. Medals and Certificates of Merit are granted to students showing certain standards of proficiency in the various classes at the Dental School. The prospectus of the Dental Hospital and School, containing full information, may be obtained from Mr. James Coltman, 13, Ellison-place, Newcastle-upon-Tyne, Dean.

Devon and Exeter Dental Hospital, 24, Southernhay West, Exeter.—The hospital is open on Mondays, Tuesdays, Wednesdays, Thursdays, Fridays, and Saturdays, and patients are admitted between the hours of 9.30 and 11 A.M. Students attend the practice of the hospital under the control of the medical officers.

Scottish Teaching Institutions.

The Incorporated Edinburgh Dental Hospital and School.—The Edinburgh Dental Hospital and School is located in spacious and well-equipped buildings at 30, 31, and 32, Chambers-street, and offers special advantages to dental students. A large and important extension of the existing buildings has now been opened. The General Courses required for the Dental Diploma may be taken in the Medical School of the Royal Colleges of Physicians and Surgeons or in the University schools. The general hospital attendance and clinical instruction are taken at the Royal Infirmary. The University, Medical Schools, and Royal Infirmary are within three minutes' walk of the Dental Hospital. The special courses are taken in the hospital. The Dental Hospital practice, extending over two years, affords a student ample opportunity for a full acquaintance with every branch of dentistry. The hospital admits a limited number of indentured pupils. They receive their instruction in Mechanical Dentistry concurrently with the general and special courses. A premium of 60 guineas is payable with each such pupil. The practice and lectures of the hospital are recognised by, and qualify for, all the Licensing Boards. Those students who desire to take a Medical and Surgical Diploma in addition to the L.D.S. have in this school admirable facilities for so doing. The triple qualification of the Royal College of Physicians and Surgeons of Edinburgh and the Royal Faculty of Physicians and Surgeons of Glasgow is recommended. The Higher Dental Diploma (H.D.D.) of the Royal College of Surgeons affords an opportunity of obtaining a higher qualification subsequent to registration. The Prospectus, with full information, may be obtained by application to the Dean or the Assistant Secretary.

Incorporated Glasgow Dental Hospital, 158, Renfrew-street and 15, Dalhousie-street, Glasgow.—The School is open to Men and Women Students, and Lectures are given on Dental Surgery, Operative Dental Surgery, Orthodontia, Dental Anatomy and Physiology, Dental Histology, Dental Mechanics, Crown and Bridge work, Dental Metallurgy, Dental Bacteriology, Radiology, Anæsthetics, and Dental Materia Medica. Lectures on general subjects required for Dentistry may be taken at the University or at one of the extra-mural schools where special provision is made for Dental Students. A new mechanical laboratory with bench accommodation for 60 pupils and fully equipped with the most modern appliances for teaching practical dental mechanics has recently been added. Full information may be had on application to the Dean.

Glasgow Royal Infirmary (Dental Department).—The following course in the curriculum can be taken at St. Mungo's College: Anatomy, six months; Practical Anatomy, nine months; Physiology, six months; Chemistry, six months; Practical Chemistry, three months; Surgery, six months; Medicine, six months; Materia Medica, three months; Dental Surgery, six months, and attendance for two years on the dental department of the hospital. Clinical Medicine (three months) and Clinical Surgery (six months) are taken at the Royal Infirmary.

Ireland.

Incorporated Dental Hospital of Ireland, Lincoln-place, Dublin.—All Dental Students who have passed their Second Dental Examination in the Royal College of Surgeons in Ireland (or an equivalent examination or examinations) are admissible to the Clinical Instruction of the Hospital. In addition to Clinical Instruction and Special Demonstrations, courses of lectures are given at the hospital on Dental Surgery and Pathology, Mechanical Dentistry, the Administration of Anæsthetics, Orthodontia, Dental Anatomy, and Dental Materia Medica, and instruction in Anæsthetics. The course in practical Dental Mechanics can be taken in the Hospital Laboratory. Further particulars can be obtained from the Dean.

Births, Marriages, and Deaths.

BIRTHS.

McElligott.—On August 9th, at "Namona," Arnos-grove, Southgate, N.14, the wife of Dr. E. T. McElligott, of a son.

MARRIAGES.

Jauch—Irmler.—On August 28th, 1929, in London, F. Joselin Jauch, M.B., B.S., F.R.C.S., to Irma C. J. Irmler.

Parker Tupling—Sedgley.—On August 1st, at St. Stephen's, Dulwich, Leslie Parker Tupling, M.R.C.S., L.R.C.P., to Daphne, youngest daughter of Mr. and Mrs. Ernest Sedgley, of Dulwich.

DEATHS.

Bell.—On August 21st, at 18, Ullet-road, Liverpool, as the result of an accident, Florence (Fon), the loved wife of Professor W. Blair Bell.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

BRITISH MEDICAL ASSOCIATION.

ANNUAL MEETING IN MANCHESTER.

(*Continued from p. 389.*)

SECTION OF PHYSIOLOGY AND BIOCHEMISTRY.

The Place of Human Physiology in the Training of Medical Students.

Opening Address.

With Prof. J. A. Milroy (Belfast) in the chair, a discusssion on this subject was opened by Prof. F. R. Fraser (London), who said there could be no better definition of the human physiology of to-day than that given by Haldane in 1916: "A new physiology which teaches what health really means, and how it maintains itself under the ordinarily varying conditions of the environment." This in turn depended on a definition of "health" and an appreciation of "the normal." For these human physiology must largely concern itself with the interaction of systems, therein differing from most animal physiology which was analytical. To-day a physician should ask to what extent and in what directions his patient's adjustments to his environment were disturbed, and when he found the cause of the maladjustment, if it be not removable, he helped the sufferer back to normality. Text-books of medicine gave a very false impression of its practice. "That awful word syndrome" dominated them, and pigeon-holing was emphatically not the best practice of medicine. The need of study of the individual as a whole rather than analytically had become increasingly apparent during the war.

Human physiology should be taught to the student before he came to the wards, partly because clinicians, though improving in this respect, were still rather inclined to ignore it. On the other hand, it was difficult for the student to understand man's adjustments and reactions until under the guidance of the clinician he saw the breakdown. The institution or addition of a course of human physiology in the final year of the medical curriculum had this objection, that it suggested that the lessons were something different and apart from the practice of medicine, and that the whole subject of physiology could be taught in the wards. As regards the physiology of the pre-clinical years, it must be remembered that these were years of scientific education, and that courses should not be altered to the detriment of their value as scientific training. Certainly the clinician could never take it all over; he had already too much to do. The physiologist must anticipate the clinician, and the clinician try to follow the lines of the physiologist. Too often the clinician, successful socially, did not seem to the student to follow a physiological or indeed any logical line of argument. Again the heads of physiological departments, for all their eminence, could not deal with semi-clinical problems, and the teacher must, indeed, be an investigator of his subject if his work was not to be dry as dust.

The reports of the Medical Research Council suggested great improvements in the teaching of physiology during the last ten years. For further progress there must be more coöperation between the physiology departments and the wards. Young clinicians should serve in the laboratory after their house appointments, but when they become consultants it was very difficult for them to continue to do any physiology. If only the heads of the departments would get together the younger men would follow. To allow time for this the heads must be relieved of excessive routine, in both teaching and administration. The discussion, Prof. Fraser thought, should deal with the following three practical points: (1) at what time or times in the curriculum is human physiology to be taught? (2) who can best teach it?; and (3) how may one best provide for its further investigation?

Dr. C. G. Douglas (Oxford) said that to many a student physiology was a task imposed upon him which delayed his entry into the wards. The student saw no value in physiology apart from its clinical application, and much physiology is not so directed. That a student should think he could deal with the abnormal without an adequate study of the normal excited Dr. Douglas's apprehension as much as his amazement, yet the fault was not entirely the student's. The problem in medical education thus raised was solved by human physiology, which had altered the student's outlook and for which we have learned new methods which enable us to appreciate the close functional linkage of the systems of the body. Time should be devoted to the subject early in the student's career to ensure the getting of his interest, and thereafter the facts of the text-books stood out in a new light. For example, for a lecturer who cares to take the trouble the changes in the body as a result of exercise could be presented as a living subject, and the student, having grasped the principles, could easily fill in the details from text-books. Practical work was as yet more difficult and lagged far behind the lecture course, but recent biochemical advances, which were mainly quantitative, were a great help. The student was keen about facts which he could verify on himself, whereas elementary experiments on the heart, muscle, and nerve of the frog were mere exercises, and never aroused his interest in the slightest degree. When the student, in the speaker's experience, came to think of the organism as a comparative whole, quantitative work, normally considered tedious, became intensely interesting. In particular the fascinating field of the physiology of the sense organs could only be explored in man.

Dr. Douglas said he would emphatically dissent from the view that such work was too difficult for the pre-clinical years. Its introduction, which had changed listlessness into interest, should be at the beginning of the study of physiology, when it would attract the student's attention. The training should be continued through the clinical years to connect the work with medicine. Though we were bound to draw some of our conclusions from the effects of disease the student's interest should be focused on the normal—too much abnormal would merely confuse him. The development of a "synthetic view" would lead to improved treatment instead of mere diagnosis.

Sir Humphry Rolleston, speaking as a member of the G.M.C., which body, he said, was too often thought of as merely inquisitional, asked if it were wise to separate human physiology in any way from physiology as a whole. There was the danger of its dropping behind clinical investigation, when advances which were at the time apparently devoid of practical application became later of great importance. He thought the physiologists might adapt the methods of instruction and illustrate them by cases from the wards. Where human histology differed from that of the cat and dog human material should be used. It should be remembered that physiology merged into experimental pathology and pharmacology, and clinical teachers should have one foot in each department. In hospitals without the clinical unit system the pathologist might teach human physiology—he hoped that the demand for teaching would create the supply. He would like to see the physician at the post-mortem table—the physician's operating table—forecasting what was there before the pathologist began, though at present this might only lead to a contest of wits. The course of physiology might be spread over the whole of the student's time or the teaching be given at two periods, first as now and again just before graduation. He then read a contribution to the discussion by Prof. Joseph Barcroft in which details of the instruction in human physiology in Cambridge were given, and which, while supporting the point of view of the opening speakers, emphasised the value of what was to be learnt from the study of evolution and the primitive forms of life.

Prof. B. A. McSwiney (Leeds) said that he had been struck by the keenness and enthusiasm of his students in the "human" part of their course. He believed in the correlation of animal experimentation and the study of human function. It was important

that the student should learn to realise normal variations. In the past physiology had not been a sufficient bridge between biology and clinical work. The biochemical aspect required further development. Instructors in human physiology should have a clinical outlook, but in hospitals there was a lack of laboratory accommodation and facilities, and too much of the work was done as a routine by the officers of the institution. Facilities for the hospital staff should be provided in the physiology department, but the present hospital system was not good for coöperation, because of the clashing interests of the L.S.D. of consultant practice with the time demanded for research and teaching. Hospitals should have officers trained in and for experimental medicine, who would work both in the laboratory and in the wards. This would guarantee the supply of clinical material for the students. As regards the argument that the curriculum is already overcrowded, we had not removed as we had added, and a radical pruning was necessary.

Dr. J. A. RYLE (London) said that the younger clinicians who had had a physiological training really did explain symptoms instead of eliciting them. All medical registrars and clinical tutors should have had a laboratory training in research, and such training was now regarded as necessary for appointment to the staff of a clinical unit. He had been much refreshed by a paper by Dr. Batten in THE LANCET of June 15th, dealing with clinical physiology and the "limits of the normal." There was much bad medicine because of isolated tests of function—a radiologist might report a "dropped stomach" in a perfectly healthy person. Closer coöperation between medicine and physiology would, in his opinion, be better than a special department of human physiology, and the medical unit was a great help for the coöperation required. Even the occasional appearance of the physiologist in the wards would be most helpful.

Dr. F. W. LAMB (Manchester) described the course which he had developed during the last seven years, which started with the biological and physical characteristics of blood, and thence led to its carriage of gases, circulation in the human subject, and respiration. The sense organs were also investigated. In the course, which continued after the physiology professional examination and through the years of clinical study, he collaborated with his clinical colleagues, giving instruction on dyspnœa, cyanosis, and the special senses from a physiologist's point of view. He was emphatic that human physiology should be treated as a science subject, not as a means to a penny-in-the-slot diagnosis for physicians, and that it should be taught as a distinct course though in close relation to experimental and chemical physiology. Human physiology was the true synthetic physiology, the integrating factor to the student, and his students were so keen that he could not get them out of the laboratory at the end of the day. He regarded lectures on human physiology as absolutely essential, there being no adequate text-book, and the monographs and papers being too much for a student to master by himself.

Prof. A. V. HILL (London) said that he agreed very largely with the previous speakers, and always regarded Dr. Lamb as the apostle of human physiology. He thought it would be a calamity if the head of a physiological department had to be a medical man—as well insist on a professor of physics having passed through the engineering shops. He gave the human physiologists a motto: "Don't do bad experiments on man in place of good experiments on animals."

Dr. H. WHITRIDGE DAVIES (Leeds) said that he had worked with students from the point of view of experimental medicine, for which the student's methods were not good enough, and from the point of view of physiology, in which he tried to fit students for clinical research. Where there was no medical unit there was no conception in the wards of analysis. The indication to students of suitable courses of special reading was much appreciated. He thought the idea of experimental medicine greatly increased the student's interest, but that the physiologist should not come to the wards unless he is prepared to come every day.

Dr. C. G. IMRIE (Sheffield) regretted the absence of Prof. Leathes, who had developed a valuable fourth-year course. He thought that it was in the wards that human physiology was appreciated, and that a new generation of clinicians was required for the desired progress and coöperation.

Prof. H. S. RAPER (Manchester) said that the pre-clinical period should be reserved for pure science, but that the student's mind would be better orientated if he got the bile and pepsin he used, not from bottles, but from the natural source, and if he did his urine analyses on his own 24-hours specimen. He regarded a full-time physiologist as a necessity on a hospital staff—even such clinicians as Horsley and Rose Bradford could not latterly keep pace with the growth of physiological knowledge.

Prof. MILROY said that he had got more help from his colleagues in physics and chemistry than from the clinical side. There should be a department of applied physiology as there was of applied biochemistry. He would plead that the present demands on students were too severe and feared the diet offered exceeded the assimilation capabilities.

Prof. FRASER, in reply, again stressed the necessity of coöperation between the heads of departments, and regretted that there had been no *practical* suggestions as to improvements in teaching in the clinical years.

Dr. DOUGLAS, in his reply, explained that in Oxford human physiology was not taught till the second year of the physiology course, which was a mistake, but that there physiology was taught as a pure cultural science, not as a pre-clinical training.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED AUGUST 17TH, 1929.

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 120 (last week 114); scarlet fever, 1688 (last week 1482); diphtheria, 844; enteric fever, 96; pneumonia, 564; puerperal fever, 43; puerperal pyrexia, 110; cerebro-spinal fever, 17; acute poliomyelitis, 12; acute polio-encephalitis, 1; encephalitis lethargica, 17; dysentery, 4; and ophthalmia neonatorum, 100. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the Metropolitan Asylums Board on August 20th–21st was as follows: Small-pox, 147 under treatment, 1 under observation (last week 132 and 5 respectively); scarlet fever, 1314; diphtheria, 1483; enteric fever, 14; measles, 348; whooping-cough, 251; puerperal fever, 25 (plus 11 babies); encephalitis lethargica, 123; and "other diseases," 23. At St. Margaret's Hospital there were 10 babies (plus 5 mothers) with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns, including London, there were no deaths from small-pox, 1 (0) from enteric fever, 27 (7) from measles, 5 (1) from scarlet fever, 17 (5) from whooping-cough, 22 (3) from diphtheria, 60 (16) from diarrhœa and enteritis under two years, and 20 (5) from influenza. The figures in parentheses are those for London itself.

Of the deaths from diarrhœa and enteritis under two, 9 were reported from Birmingham, 5 from Liverpool, and 4 from Hull. Liverpool recorded 4 deaths from measles and 4 from whooping-cough.

The number of stillbirths notified during the week was 252 (corresponding to a rate of 36 per 1000 total births), including 47 in London.

THE Medical Research Council issued at the end of last week the results of a series of studies on binocular vision, undertaken at the Royal Naval College, Greenwich, by Instructor-Lieutenant-Commander N. M. S. Langlands, R.N. Commander Langlands's work has extended over several years, special facilities for carrying it out having been granted by the Admiralty.

PUBLIC HEALTH AND LOCAL GOVERNMENT.[1]

THE state of the public health for 1928 is summarised in the annual report of the Chief Medical Officer of the Ministry of Health which is published this week. In an introductory chapter Sir George Newman sets out, always clearly and often eloquently, certain fundamental information which is necessary for a reasonable understanding of the chapters which follow. For the Report submits an extraordinarily varied body of information and opinions, as might be expected when we consider the simple yet complicated, the separate and yet connected conditions which go to make up society to-day, and when we recognise at the same time that those conditions, because the nation remains young and lively are often new, and yet, because we are an old people, often have their roots in a remote ancestry. The introduction is, in a sense, a sequel to the essay which prefixed Sir George's Annual Report last year,[2] in which he set out the principles which should guide forthcoming changes in local government. This year he proposes to help the public to form a sound judgment and, as far as may be, an estimate of the position of our public medicine, such a bird's-eye view enabling the reader to gauge the value of the different detailed communications as well as to understand how these form component parts of one work.

The sum of the responsibilities of the Minister, as defined by the Ministry of Health Act, 1919, are: "to take all such steps as may be desirable to secure the preparation, effective carrying out and coördination of measures conducive to the health of the people," and the first of these duties is the prevention and cure of diseases. The main part of the Annual Report, as might be expected, deals with these steps under such headings as general epidemiology, the incidence during the year of influenza, cancer, tuberculosis, and venereal disease; and those who have followed the reports of the medical officers of health of the various sanitary districts for the year in question will be prepared to find, with respect to the last two, that the tidings are good. The chapter on tuberculosis is far ranging, taking note of the progress of tuberculosis work as carried out in dispensaries and residential institutions, of the influence of the Act of 1929 on the development of tuberculosis schemes, of the value of after-care and of technical education, and, among special points, of the efficacy of Prof. Calmette's method of immunisation, the fate of young children in tuberculous households, and of tuberculosis in relation to occupation, the example here being the incidence of the disease on printers. The standard death-rates for tuberculosis of the respiratory system show that the gross death-rate from pulmonary tuberculosis in males has fallen from 1233 per million to 879, and in females from 900 to 641 since 1911, while the reduction in non-pulmonary tuberculosis, attacking both sexes, is even more striking. These figures may be said to justify the general opinion that notification of tuberculosis is year by year becoming more effective. The chapter dealing with the incidence of venereal disease is, on the whole, happy in its message. Although the returns from the treatment centres for 1928 show only a decrease of 2·7 per cent. in new cases of syphilis, against which has to be set off an increase of 9·9 per cent. in cases of gonorrhœa, the improvement in the ratio of females to males, which emerged from the figures last year, has been maintained, and there is distinctly greater promptitude in seeking treatment.

Two sections of the report call especially for mention—viz., the incidence of small-pox and the whole subject of maternity. In 1928 there were 12,428 cases of small-pox, most of them extremely mild, but 53 deaths were attributed to the disease. Seventeen of the victims were unvaccinated, 28 had been vaccinated in infancy only, and the vaccination of the remainder was doubtful. Cases occurred in every English county except Rutland, Westmorland, Cumberland, and the Isle of Wight. There were, however, some 2000 fewer cases than in 1927, and nearly 4000 fewer in the county of Durham, where the disease has for some years been prevalent. Many of the cases were at first mistaken for influenza. The report observes that even in Jenner's day some cases were so mild that children ran about the streets with the rash on them, and sees no reason to think that we have recently been dealing with a disease specifically different from small-pox. Where the disease is vigorously attacked it is controllable, but mild cases are frequently overlooked, and the infection spreads. The relative immunity of London is a remarkable fact for which there is no explanation. The introduction by the *Tuscania* on April 1st, 1929, of a severe type of small-pox called for vigorous action, which was so successfully carried out that only six secondary cases developed, and at the expiration of six weeks or so there was no infection of the *Tuscania* strain in the country.[3] The episode is noted in the Report although, not strictly speaking, belonging to the year 1928.

Much attention was paid during 1928 to the high mortality which still attends the process of childbirth; 2920 women died and an enormous number were invalided, while about 43,000 children died during their first year of life. The maternal mortality-rate of 4·42 per thousand births was the highest on record, and there is no doubt that much of the mortality and morbidity was preventable. Two official committees are exploring the problem. Pending the result of their inquiries Sir George makes trenchant remarks. First, he notes that many pregnant women are not making use of the facilities already provided for them. Secondly, he points out that many local authorities are not vigilantly engaged in perfecting every branch of their maternity service, and are not closely coördinating these branches into one unified attack on the problem. Merely to provide facilities is not enough. It is for the local authority to see that the provision it makes is effectively coördinated.

Another prime duty of the Minister of Health, as defined under the Health Act, is "the collection, preparation, publication, and dissemination of information and statistics," and Sir George's Report discharges the responsibility of the Minister succinctly, while many of the facts and figures of the Report speak for themselves. The birth-rate for the year was 16·7, a greatly reduced number, which is accompanied by a substantial saving of child life. Children are decreasing in proportion to the whole population, while the number of persons over 55 is increasing. The death-rate was 11·7 per thousand persons. The birth-rate thus exceeded the death-rate by 5 per thousand, and we seem to be within sight of a stationary population. In 1928, the country saved 41,500 babies' lives, over and above the average annual saving during the first ten years of the century. The incidence of sickness, apart from infectious disease, cannot be estimated except from the returns of insurance practitioners. These indicate that during the year the nation lost a total of 26¾ million weeks' work among the insured population to whom sickness benefit was payable—that is, among a very small proportion of the nation. In the list of diseases responsible for the loss of work among these people, respiratory maladies easily take the first place, accounting for some 30 per cent. They are followed by irregularities of the digestive system, injuries, lumbago, and rheumatism and septic conditions. The chief causes of death were diseases of the heart and circulation (23 per cent.), respiratory diseases

[1] On the State of the Public Health. H.M. Stationery Office. 1929. Pp. 295. 3s.

[2] THE LANCET, 1928, ii., 875.

[3] The new Vaccination Order, which is the result of the work of the Rolleston Report, was discussed in our columns last week.

(13 per cent.), cancer (12 per cent.), diseases of the nervous system (9 per cent.), and tuberculosis (8 per cent.). These five conditions, accounting for 65 per cent. of the death-rate, are the outstanding physical scourges which we have to combat to-day. The year 1928 was exceptionally healthy.

An outstanding event of the year on the administrative side was the preparation of the Local Government Act. The Report discusses carefully the new duties laid upon the County Medical Officers of Health, and the Principal Medical Officer has no doubt that the reforming Act offers big potentialities if it is administered carefully. Also he sees no reason why the magnificent tradition of the voluntary hospital should not become widely established in municipal hospitals free from the taint of pauperism. He advises the municipal hospitals to imitate all that has proved good in the voluntary hospitals, and urges mutual coöperation. The great essential here is the preservation of the integrity of the medical profession; prevention and cure and their respective exponents must not be divided. So long as no one comes between the doctor and his patient all will be well, and local authorities ought to be trusted to see that such interference never takes place. In this country, the principle of local self-government has been generally recognised as the essence and genius of our national vigour. Our public health work is safeguarded by a comprehensive system of law, by-law and regulation, exercised by central and local authority working together, administered partly by a number of elected voluntary representatives and partly by a substantial number of medical advisors and trained sanitary and health officers. The chief business of the Ministry of Health is unification and coördination; its chief purpose is to secure sound national progress. This progress will be made certain in proportion as the State, the doctor, and the public work along right lines harmoniously.

We shall deal with the Report in further detail in subsequent issues.

Medical News.

MEDICAL SOCIETY OF LONDON.—A programme for the first half session 1929-30 has been issued. Mr. Donald Armour will deliver a presidential address entitled Some of Lettsom's Contemporaries on Oct. 14th. Mr. Hayward Pinch and Prof. Sidney Russ will open a discussion on Radium Therapy on Oct. 28th. On Nov. 11th a discussion on the Relative Value of the Different Methods of Diagnosis in Gastric Disease will be introduced by Dr. J. A. Ryle, Dr. Harrison Orton, and Prof. E. C. Dodds, and a discussion on the Treatment of Head Injuries by Mr. Wilfred Trotter on Dec. 9th. Sir John Thomson Walker will give the Lettsomian lectures on Enlarged Prostate and Prostatectomy, and Sir Arthur Keith the Annual Oration on Modern Medicine and Evolution.

Sir George Newman, who has been since 1919 a Crown Representative for England on the General Medical Council, has been re-nominated for a further term of five years from Oct. 9th next.

THE Medical Research Council announce the receipt from Mrs. Odo Cross of a sum of £40,000 as the endowment of a trust for the establishment of research fellowships in the study of tuberculosis, to be known as the "Dorothy Temple Cross Research Fellowship Fund."

Dr. W. E. Gye writes to disclaim responsibility for statements contained in a Sunday newspaper of August 25th concerning his work on cancer. It is true, he says, that a somewhat lengthy paper is in preparation, but the suggestion that he has something new and "sensational" to report is a guess and is untrue.

THE RADIUM HOSPITAL FOR WOMEN.—It is expected that this hospital will be opened in September by Madame Curie. It is housed in the former residence of the late Mr. John Petrie, R.A., in Fitzjohn's-avenue, Hampstead, which has been converted by Mrs. Elizabeth Scott, the architect. The large and lofty studio has been made into the chief ward and holds 15 beds; other small wards accomodate another ten beds. It is hoped to build another ward over the studio with X ray and other necessary equipment. The medical staff consists entirely of women.

Notes, Comments, and Abstracts.

THE TECHNIQUE OF STUDY.

By G. F. WALKER, M.D., M.R.C.P.,
MEDICAL TUTOR AND REGISTRAR IN THE UNIVERSITY OF LEEDS, AND THE GENERAL INFIRMARY AT LEEDS.

To add one single drop to the torrent of written and spoken advice which almost overwhelms a medical student at varying phases in his career requires explanation. I am emboldened to submit the following notes because, while still retaining vivid memories of the doubts and difficulties of my own student days, I find myself engaged in tutorial work in a large teaching hospital. Much of what follows has necessarily been gleaned from my own teachers quite recently, and I hereby make acknowledgment, but some, I trust, is new.

Personal Factors.

"The first wealth is health." Medical students are far too ready to slump into a condition of middling physical health. A reaction against the athleticism of some public schools tends to set in early, forcibly and far too frequently when undergraduate life is reached. But sound physical health is all-important and must be maintained. The rich opportunities given by University or community life for the preservation of physical fitness should be exploited fully. Indeed, a certain portion of each week and each year should be set aside exclusively for recreation. Of collateral importance is the development of mental stamina. This term is comprehensive and includes not only the acquisition and maintenance of will and judgment, remote alike from rashness and pusillanimity, nor merely the ability to sacrifice the present to the future, but also the cultivation of the gentler arts of this world. Medicine may be a jealous mistress, but he who gives her his all will never experience the content and philosophical security which a broad general culture imparts. In the years of student-life time must be found for the study of a science for its own sake—any particular field of study such as astronomy or theology or any subject which happens to appeal to the individual—or for the cultivation of literature or an art. In this connexion must be mentioned the necessity for travel in the student years. Many great cities of Western Europe are cheaply and easily accessible and should be visited in the holidays. If these cannot be reached then—speaking to Leeds students—Edinburgh, York, and London must suffice. During these tours, whether at home or abroad, there can be no harm in visiting the hospitals and schools, but any attempt at promiscuous study should be firmly suppressed. But I have forgotten that the medical student has to study medicine, and all through the student years the habit of study has to be diligently cultivated.

The Technique of Study.

Much knowledge has to be acquired in a relatively short time. It is necessary, for instance, to know that the islets of Langerhans are not in Polynesia. But this loading up with necessary facts is by no means the hardest or the most important part of the curriculum. Of much greater importance is the acquisition of technical skill, dexterity, practical experience, and clinical acumen. Of greater importance still is the keeping of a proper perspective during the various stages and appointments of the curriculum as will appear. In reading and practical work every student should periodically examine his methods of study, ruthlessly scrapping unprofitable habits and customs. Reading should be done in the evening. And the minute technique of reading is worth more than scanty consideration. At the very outset the student should decide whether he remembers best by merely looking at the written word, or by writing it down personally, or by hearing it spoken. That is to say, he should decide whether he has a "visual" memory or an "auditory" memory. The former is fortunately the more common, but no general rule can be laid down. By actual experiment every student must investigate his powers of memory, decide his own classification, and work on it. Once the most favourable channel for reception of facts is decided upon details of study can be regulated. Study from books should be done with elbows on the table. It should be done in privacy and in an environment conductive to alertness and clarity. Anything conducive to too much physical comfort must be shunned. No attempt should be made to read soon after a meal or when tired. Reading in the train or 'bus, or "at any old time," is waste of energy and promotes staleness. As a general rule, if the practical work of a working day has been faithfully performed, two hours' book work in the evening is ample, and it is then that reading should consolidate and fix the practical work done during the day. Therefore it should be an inviolable

rule that whatever has been seen or heard in the lecture-room, laboratories, or wards during the day should have first claim on the time available for reading during the evening. Surgery must be read during the performance of surgical appointments, ophthalmology while the student is actually seeing ophthalmic patients, and so forth. It is worse than useless to attempt to acquire the formal dogmas of medicine by suddenly beginning at page 1 in a large text-book. The greater part of each morning and afternoon should be devoted to practical work and training. The surpassing value of dissection, of study in the wards, out-patient department, and receiving-room, of lectures which flavour facts with a lecturer's personal experience, and particularly of the "writing-up" of patients' records, needs no emphasis. It may be taken for granted that a "part" once thoroughly dissected is etched deeply in the memory. Similarly, a scientific or clinical investigation once thoroughly performed repays the investigator many times over by conferring ineradicable knowledge. In dissecting the student should display the region so that he can subsequently recall it in three dimensions. And in investigating patients, when once the full straight facts have been clearly displayed, the imagination should be invoked to illuminate the patients' own side of the problem. For the precise and formal extraction of data about a patient I know of no more pithy and significant advice than the exhortation "Look and see," and the cultivation of sincerity and the preservation of an ever open mind should be comprised in that advice. Further, the technique of practical study needs as much watchful care as does the technique of reading. It is very easy during the clinical years to be in a place where work can be done, should be done, and is in fact being done—by others. The tendency to lapse into intellectual somnolence during demonstrations is very insidious in its onset, but a habit of vigorous, enthusiastic attention is not difficult to acquire, and, when once acquired, being seldom lost, should be striven for. The mere acquisition of the habit is worth while for its own sake; its utility will probably outlive the utility of many of the topics to which it is first applied. A large teaching hospital usually abounds in places where dawdling is possible and prevalent, and which need not be specified.

Here are two little pieces of advice. First, the midday meal should be taken free from "shop." Secondly, the notebook is worth consideration—a good small loose-leaf notebook should accompany the student through his whole curriculum; it should be just small enough to fit in the pocket, it should be available at all times, and each night it should be tidied up and full pages withdrawn to be placed in appropriate accumulations.

The Course as a Whole.

The really fundamental thing to grasp is that the course *is* a whole and not a string of loosely connected segments each requiring a concentrated onslaught with subsequent relegation to the background. I do not mean that a student should attempt to go forward three steps at a time, but I do mean that he should look upon his curriculum as a series of phases of initiation into the science and art. Each phase prepares the student for subsequent phases, but is very dependent for its full consummation on preceding phases. To reduce this to practical terms it may be said that anatomy and physiology should forthwith be continuously studied during clinical work. And other examples will readily occur. It follows from the fact of the unity of the course that the text-books of each phase should be retained and kept viable during subsequent phases. Revision and maintenance of knowledge is much safer and easier if done from the actual pages of the big text-book used during the phase when it was intensely studied. I say "big" text-book, because one big text-book should be selected for each topic and adhered to from start to finish. The small summaries and cram books have their place, but they are mainly useful as a help to marshal facts. The author of a most successful synopsis, far from making the usual claim to be meeting a "long-felt want," says in his preface that ultimate reliance on anything but the larger books will lead to failure. Just as the text-books of successive phases should be carefully retained throughout, so must the microscope not be sold. Being "historically minded" is valuable. I do not mean that the shelves should be laden with large text-books on the history of medicine, but the bald facts of study can be enlivened by reference to an encyclopædia when a proper name is found. And from time to time monographs such as Flint's "The Heart: Old and New Views," should be perused.

Examination Incidents.

It is quite useless to ignore the fact that examinations loom largely in the curriculum. I have many times told my student friends that the examination incidents—and I am convinced that "incident" is the right word—should be happy little episodes. This information has always evoked incredulity and sometimes less amiable emotional reaction, but on several occasions graduates have subsequently admitted personal verification. Of course, no one but a fool would make light of examinations. Indeed, they should be taken very seriously; so seriously that the student, immediately he enters a particular phase, should plan out his work for the terminal examination of that phase by actual time-table and schedule. He should record diagrammatically his progress through the phase so that the work is spread out evenly over the time available. As a crude example let us suppose that a phase of study in one of the ancillary subjects lasts six months and that the text-book concerned is 500 pages in thickness. Then 100 pages must be covered each month by schedule, the actual pages being selected each evening according to the nature of the particular lecture, demonstrations, and practical work enjoyed during the day. In short, I am back at the platitude that the art of passing examinations consists in doing steady comprehensive work during the whole of the antecedent phase. The corollary to this is that he who works steadily in the practical work of a phase with concurrent systematic reading cannot be "ploughed."

Vacancies.

For further information refer to the advertisement columns.

Albert Dock Hospital, Connaught-road, E.—M.O. At rate of £110.
All Saints' Hospital, 91, Finchley-road, N.W.—Jun. H.S. Also Asst. H.S. At rate of £150 and £100 respectively.
Aylesbury, Royal Buckinghamshire Hospital.—Res. M.O. At rate of £180.
Ayr County Hospital.—2 H.S.'s. Each at rate of £150.
Beckenham Urban District Council.—Part-time Asst. M.O. £325.
Birmingham and Midland Eye Hospital, Church-street.—H.S. £110.
Bolingbroke Hospital, Wandsworth Common, S.W.—H.S. At rate of £120.
Bootle Borough Hospital, Derby-road.—Hon. Laryngologist and Aurist. Also Jun. M.O. At rate of £125.
Bournemouth, Royal Victoria and West Hants Hospital.—2nd H.S. At rate of £120.
Bradford Children's Hospital.—H.S. and H.P. Each £120.
Bradford, Royal Eye and Ear Hospital.—Jun. H.S. £120.
Brighton, Royal Alexandra Hospital, &c.—H.S. At rate of £100.
Calcutta, Presidency College, Bengal.—Prof. of Physiology. Rs. 1000.
Cambridge, Addenbrooke's Hospital.—Res. Anæsthetist. At rate of £180. Also H.P. and H.S. Each at rate of £130.
Cambridge, Papworth Village Settlement.—H.P. At rate of £100–£200.
Central London Throat, Nose, and Ear Hospital, Gray's Inn-road, W.C.—Hon. Chief Clinical Assts.
Dreadnought Hospital, Greenwich.—H.P. and H.S. Each at rate of £110.
Exeter, Royal Devon and Exeter Hospital.—H.P. Also Asst. H.S. At rate of £130 and £120 respectively.
Fulham Maternity and Child Welfare Clinics.—Part-time M.O. 1½ gns. per session.
Leeds Maternity Hospital.—Hon. Obstetric Surgeon.
Leeds, St. James' Hospital.—H.P. and S. £200.
Liverpool, Royal Children's Hospital.—Res. H.P. Also H.S. Each at rate of £60.
Liverpool, St. Paul's Eye Hospital.—H.S. £100.
Liverpool, Walton Institution, Rice-lane.—Res. Asst. M.O. £200.
London Lock Hospital, 91, Dean-street, W.—H.S. At rate of £200.
London University.—William Julius Mickle Fellowship. £200.
Maidstone, Kent County Ophthalmic and Aural Hospital.—Aural H.S. At rate of £200.
Manchester, Monsall Hospital for Infectious Diseases.—Jun. M.O. £350.
Manchester Royal Eye Hospital.—Jun. H.S. £120.
Margate, Royal Sea Bathing Hospital.—H.S. At rate of £100.
Middlesex County Council.—Asst. County M.O.H. £750.
Newcastle-upon-Tyne City Mental Hospital, Gosforth.—Jun. Asst. M.O. £350.
Northampton General Hospital.—H.P., H.S., and Asst. H.S. Each at rate of £150.
North Middlesex Hospital, Edmonton, N.—Anæsthetist. 2½ guineas per session.
Norwich, Jenny Lind Hospital for Children.—Res. M.O. £120.
Otago and Dunedin University Hospital, New Zealand.—Sen. Res. M.O. £500.
Queen Charlotte's Maternity Hospital, Marylebone-road, N.W.—District Res. M.O. Also Asst. Res. M.O. Each at rate of £80.
Radcliffe-on-Trent, Notts County Mental Hospital.—Jun. Asst. M.O. £350.
Richmond Royal Hospital, Surrey.—Jun. H.S. £100.
Rochester, St. Bartholomew's Hospital.—H.P. At rate of £175.
Royal Liverpool Babies' Hospital.—Res. M.O. At rate of £90.
Royal Northern Hospital, Holloway, N.—H.P. Also Obstetric H.S. Each at rate of £70.
R.S.B.H. Offices, 15, York Buildings, Adelphi, W.C.—H.S. At rate of £100.
Southampton, Royal South Hants and Southampton Hospital.—Jun. H.S. Also Cas. O. At rate of £130 and £120 respectively.
Swansea Hospital.—Sen. Res. M.O. Also H.S. £300 and £150 respectively.
University College Hospital, Gower-street, W.C.—Asst. Radiologist. £200.
Walsall General Hospital.—Res. Surg. O. At rate of £200.
Watford, Herts, Peace Memorial Hosp.—Res. M.O. At rate of £150.

Lettsomian Lectures

ON THE

RELATIONSHIP OF DERMATOLOGY TO OTHER BRANCHES OF MEDICINE.

Delivered before the Medical Society of London

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LECTURE II.*

I PROPOSE in this lecture to discuss the significance and nature of a group of eruptions provoked by micro-organisms or toxins, which reach the skin via the blood stream. For the sake of clarity, I would suggest for this group the generic name of the *exanthematides*. This term indicates a relationship with the exanthemata of the specific fevers, which is undoubted, and at the same time possesses the termination "ide," which has been commonly accepted for some of the eruptions under consideration—e.g., the tuberculides, syphilides, trichophytides, and leprides.

If, after excluding the specific fevers, one surveys the list of general infective diseases associated with cutaneous manifestations, two are outstanding by reason of their ubiquity, their serious nature, their chronicity, and the amount of accurate knowledge that has accumulated concerning them; these two diseases are tuberculosis and syphilis. They have dominated medical thought and research for generations; they still dominate dermatological thought and research throughout the greater part of the world.

Less obviously of interest to dermatologists is another group of diseases, which the general physician has labelled "rheumatic." But if tuberculosis and syphilis belong in great part to the domain of dermatology, the rheumatic diseases, especially, perhaps, rheumatic fever, also have cutaneous manifestations, which are not only of interest to physicians and dermatologists alike, but are in my opinion so closely akin in their mechanism of production and significance to certain tuberculous and syphilitic eruptions, that they enable us to draw deductions of the highest importance.

Since Poynton and Paine[1] in 1900 presented their thesis that rheumatic fever is due to streptococcal infection, evidence has gradually accumulated that both this condition, as well as certain other forms of rheumatic disease, are of streptococcal origin. Although I have reviewed a great deal of the experimental work that has been carried out in recent years on the pathogenesis of rheumatic fever, I am obviously not fitted to express an authoritative opinion on the streptococcal theory of its causation. Whether, however, one accepts the specificity of the particular strain or strains of streptococcus, isolated by Small[2], by Birkhaug,[3] and by Lazarus-Barlow,[4] or whether with Swift[5] and his co-workers one believes, as seems more probable, that the pathogenesis of the disease depends on the existence in certain persons of a condition of allergy to various strains of streptococci, resulting from repeated low-grade infections or the existence of chronic foci of infection, the evidence that like tuberculosis and syphilis, rheumatic fever is allergic in nature, and that the streptococcal group of organisms is responsible seems to me overwhelming. This evidence is based on clinical, pathological, bacteriological, and experimental findings, and I have yet to hear any argument to the contrary that will bear examination.

Swift[6] in America, and Bezançon and Weil[7] in France, have drawn striking comparisons between the various manifestations of rheumatic fever with those of tuberculosis and syphilis.

* Lecture I. appeared in THE LANCET of August 24th.

To quote Swift, Derick, and Hitchcock:—

"In all three diseases there is usually an initial lesion, which, when present, is followed shortly by distinct enlargement of the satellite lymph nodes. In all, the serious manifestations occur at a distance from this lesion, and usually are multiple in distribution. In tuberculosis, although the majority of the population is infected, only relatively few persons ever show clinical symptoms. In both rheumatic fever and tuberculosis a rise in the standard of general living conditions has been accompanied by a decreasing incidence of the diseases. A number of workers have called attention to a similarity in the familial incidences of these two infections. In all three diseases there is a decided tendency to relapses, which seems to be due to a breakdown of a partial immunity. In all the histopathological pictures of the typical lesion is that of a granuloma, the histogenesis of which in tuberculosis and syphilis has been definitely proven to be allergic in nature. This allergic lesion can be considered an effort on the part of the body to restrict the activity of the micro-organism to these local areas. The tubercle has the same general characteristics throughout the life of the individual, although there may be special features of the tuberculous infection in certain tissues or organs. While the different syphilides may seem to have decidedly different characteristics, these variations may be considered quantitative rather than qualitative. In both tuberculosis and rheumatic fever the presence of lesions in the walls of the serous cavities or joints is accompanied by the outpouring of serofibrinous exudate. In both rheumatic fever and syphilis there is a marked tendency to focal endo- and perivascular involvement; and both infections are prone to attack the heart. It is true that differences can be found in the three diseases; but it is in these differences that there reside the features which bring about the peculiar pictures of the respective maladies. Indeed, in individual cases it is sometimes difficult to decide whether one or another type of infection is active until specific differential diagnostic measures can be applied."

It is my general agreement with this thesis that has led me to sunbmit a comparison between certain cutaneous manifestations of tuberculosis and syphilis together with those of the severer forms of ringworm infection on the one hand, and of rheumatic or streptococcal infection on the other. All these eruptions may, I think, be conveniently classed together as the exanthematides.

A. THE SYPHILIDES.

In the average case of untreated syphilis there is:—

(1) A period of incubation, about three weeks in duration, between contamination and the appearance of the *primary lesion*.

(2) A primary period during which the spirochætes multiply locally, invade the lymphatics and glands, thence to reach the circulation, but the Wassermann reaction is negative; this is also about three weeks in duration.

(3) A second incubation period, again of about three weeks, between the first appearance of a positive Wassermann reaction and the development of the secondary eruptions—*the secondary syphilides*. With these the Wassermann reaction is at its height. The various forms of secondary syphilide become successively less extensive, but larger in size, and the Wassermann reaction also tends to diminish in intensity.

(4) With the subsidence of secondary manifestations, there may be a period of freedom from symptoms, and the Wassermann reaction may become latent or actually negative.

(5) Finally, there is the *tertiary* period, when the large nodular gummata represent the cutaneous manifestations, and the Wassermann reaction is found positive in from 60–80 per cent. of cases.

As in the specific fevers, there is thus an incubation period during which time a state of allergy towards the infecting virus is developing, and the secondary syphilides, corresponding to the exanthematous rashes, represent allergic reactions of the skin against the spirochætes reaching it via the blood stream, such reactions having for their object the destruction of the organisms in situ. This question will be discussed more in detail in connexion with the tuberculides and trichophytides.

B. THE TUBERCULIDES.

Although tuberculosis cannot so readily as syphilis be divided into primary, secondary, and tertiary

periods, nevertheless such a division can be made, and the cutaneous manifestations of the two diseases be very closely compared. In the vast majority of cases, infection with the tubercle bacillus takes place via the digestive tract—mouth, nasopharynx, or small intestine—thence reaching the lymphatic system. As Calmette[8] has clearly shown, the view, still widely held, of a primary "chancre of inoculation" in the lung ("lesion of Parrot and Kuss") is open to serious criticism. Very occasionally, however, a true primary tuberculous chancre of the skin may occur, comparable to the primary sore of syphilis, and to that evoked by the experimental inoculation of the skin in animals. Holt[9] has collected 41 cases, including one under his own observation, in which the primary chancre developed on the penis of infants after ritual circumcision by a phthisical rabbi, and of these 16 are known to have died. Milian and Brocq have recorded two examples on the lips, and Bruusgaard has studied seven cases. From the primary lesion the neighbouring lymphatics and glands are invaded, and the Pirquet reaction becomes positive in from 12 days to some weeks. Boeck[10] and Bruusgaard[11] have seen an eruption of lichen scrofulosorum, with a phlyctenular keratitis, develop six weeks after the healing of such a chancre on the finger (compare with a secondary syphilide).

In 1896, Darier[12] proposed the term "tuberculides" for a group of eruptions occurring in frequent association with evident manifestations of tuberculosis. Considerable discussion has naturally taken place, as to what are and what are not tuberculides. The list suggested by Darier himself in the last edition of his Précis, is as follows:—

(A) *Cutaneous Tuberculides.*—The situation of the lesions is dermo-epidermic in the following forms of tuberculide.
(1) *Lichenoid.*—Lichen scrofulosorum.
(2) *Papulo-necrotic.*—Folliclis; acnitis of Barthélemy.
(3) *Acneiform.*—Acne cachecticorum of Hebra (a simple variety of (2).
(4) *Lupoid.*—Benign sarcoid or lupoid of Boeck. Lupus pernio.
(5) *Erythemato-atrophic.*—Lupus erythematosus—fixed type.
(6) *Erythematous.*—Exanthematous lupus erythematosus: tuberculous form of erythema perstans.
(B) *Hypodermic Tuberculides.*—The situation is in the subcutaneous tissue. These are represented by the tuberculous form of erythema induratum (Bazin's disease), the subcutaneous sarcoids of Darier-Roussy, and the disseminated nodular sarcoids, all of which are probably merely varieties of the same type of lesion. Erythema nodosum probably should be included in some cases.

Of these every one is agreed as to the claims of lichen scrofulosorum, the papulo-necrotic varieties (folliclis, &c.), and at any rate the majority of cases of Bazin's erythema induratum. While most dermatologists consider that in some instances lupus erythematosus is of tuberculous origin, Schaumann[13] prefers to class it, not with the tuberculides, but, in association with lupus pernio, the sarcoids of Boeck, and the malignant lymphogranuloma of Sternberg, as a cutaneous manifestation of paratuberculosis, due to the filtrable form of the tubercle bacillus. In addition, erythema nodosum and erythema multiforme are considered by some to be toxi-tuberculides in certain cases.

Pathogenesis of the Tuberculides.

A great deal of very careful experimental work has been carried out in connexion with the pathogenesis of the tuberculides, and it has thrown much light on the phenomenon of allergy, and on the part played by the skin in the defence of the body as a whole. Briefly, the salient points may be summarised as follows:—

The clue to the nature of the tuberculides is provided by the phenomenon described by Koch[14] in 1891. As is well known, the subcutaneous inoculation of virulent tubercle bacilli into a susceptible animal like the guinea-pig is followed after 10–15 days by a nodule which ulcerates—the tuberculous chancre—comparable to the primary sore of syphilis, and identical with that occasionally met with in young children, not previously infected with tubercle, as already stated. This experimental chancre persists, and in it the bacilli multiply, invade the lymphatics and glands, and eventually produce a generalised visceral tuberculosis, affecting chiefly the liver and spleen, from which the animal dies. If the guinea-pig be reinoculated at another point in the skin before its death—preferably 4–6 weeks after the primary inoculation—with living or dead bacilli, an inflammatory hæmorrhagic lesion is rapidly formed, which breaks down, scabs over, and, unlike the primary chancre, heals, leaving a scar. In it the newly inoculated bacilli are destroyed, and there is no invasion of the adjacent lymphatic glands. This is the so-called Koch's phenomenon, and the lesion resulting from the second inoculation represents a defensive reaction against the superinfection (Calmette), and is comparable to certain forms of tuberculide as they occur in human beings. As Sequeira[15] puts it, the tuberculides are spontaneous examples of Koch's phenomenon.

Gougerot and Laroche,[16] Lewandowsky,[17] and others may be said to have produced tuberculides experimentally, the two first mentioned by rubbing the epilated skin of guinea-pigs, *previously tuberculised*, with emulsions of living and dead bacilli, Lewandowsky by inoculating bacilli directly into the left ventricle or veins. The lesions thus produced correspond clinically and histologically to human tuberculides—particularly of the papulo-necrotic type.

The explanation, then, of the tuberculides usually given is that in a person, already sensitised to tubercle—i.e., in a state of allergy, and with an active tuberculous focus, such as lymphatic glands—there occurs a bacteriæmia with dead or attenuated bacilli, and these, coming to rest in a small dermic or hypodermic vessel, provoke a local inflammatory tissue reaction of the tuberculoid type, which has for its object the destruction of the embolised bacillus, and is thus a protective mechanism. This would explain why bacilli are so seldom demonstrable in the lesions, and why animal inoculation with material from them so often fails; nevertheless, in recent lesions bacilli have been found, or successful inoculations have been made by several observers in lichen scrofulosorum, papulo-necrotic tuberculide, erythema induratum, lupus erythematosus, and in the lupoids of Boeck. Moreover the injections of tuberculin into a person with active tuberculosis may provoke an outbreak of tuberculides—e.g., lichen scrofulosorum, erythema induratum, and when such are already present, marked focal reactions occur.

It will be seen that in the mechanism of their production the tuberculides resemble the secondary and tertiary eruptions of syphilis, since they represent allergic reactions of the sensitised skin or subcutaneous tissue against tubercle bacilli circulating in the blood stream.

C. The Trichophytides.

In 1912, Jadassohn,[18] and later Guth,[19] Sutter,[20] Bloch,[21] Rasch,[22] Pulvermacher,[23] Jessner,[24] Ambrosoli,[25] Bruusgaard,[26] and others, described a variety of *generalised* eruptions that might occur as a result of a local infection of the skin with ringworm fungi, when such infection caused an inflammatory reaction of sufficient intensity. Following Darier's terminology, these eruptions are called trichophytides, microsporides, and favides, according to the type of ringworm fungus responsible. For the sake of convenience I shall include them all under the name of trichophytide. They are exactly comparable to the syphilides and tuberculides. As in the majority of cases of syphilis, there is a primary lesion in the skin, which develops at the site of inoculation of the fungus. As a result of this, the skin as a whole may become sensitised, so that, should dissemination of the fungus or of its toxin through the blood stream occur, the secondary eruptions—trichophytides—result from their contact with the sensitised skin. It is only, however, in the severer forms of suppurative ringworm—usually of animal origin—that these secondary eruptions are likely to be met with. I believe that Neisser and Plato[27] in 1902 were the first to prepare

an extract from ringworm fungi, which they named trichophytin, and which is analogous to tuberculin. They found that in cases of deep-seated ringworm—i.e., those in which there is a marked inflammatory reaction—the injection of this trichophytin provoked a general reaction with rise of temperature and constitutional symptoms, together with a local reaction at the site of injection and a focal response in the area of infection. Normal controls, patients with other diseases, and those suffering from the *superficial* forms of ringworm, gave no local or general reactions. Since then a good deal of experimental work has been carried out along similar lines. Briefly it may be said:—

(1) That a deep-seated ringworm in man, or an experimental infection with certain species of ringworm in animals, may produce an allergic state, so that general and focal reactions result from injection of trichophytin, and positive cutaneous or intracutaneous tests with this substance may be obtained, which persists for years after the infection is cured.

(2) In animals a lasting immunity to reinfection results. In man, a reinoculation produces a short-lived lesion, comparable to that arising from a second inoculation of tubercle bacilli in Koch's phenomenon. Clinically, a deep-seated ringworm produces a very considerable degree of immunity in the sense that second attacks are very rare; this is probably due to cutaneous allergy, which causes rapid destruction of the reinoculated fungus, rather than to true immunity.

(3) It has been shown by Bloch, first, that animal immunity to ringworm can only be produced by inoculating the skin, subcutaneous or intraperitoneal inoculations being ineffective; secondly, that in a sensitised person the sensitiveness is in the skin-cell itself, for by transplanting two pieces of skin, one from a sensitised and one from a non-sensitised person, on to a normal person, the piece from the sensitised person, after the graft had healed, gave a positive cutaneous reaction to trichophytin, whereas the other piece and the subject's own skin gave negative results.

(4) As a result of suppurative ringworm infection (most commonly in trichophytosis) there may occur generalised eruptions—the trichophytides, microsporides, and favides—accompanied sometimes by fever, enlargement of the lymphatic glands and spleen, swelling of the joints, and a polymorphonuclear leucocytosis. In some cases these eruptions are due to dissemination of the fungus spores through the blood stream, since the fungus has not only been successfully cultured from deep-seated nodular or papular trichophytides by several observers, but also from the circulating blood itself by Ambrosoli and by Jessner. In some cases, however, these general eruptions may result from exogenous spread from the primary site of infection by the lymphatics, for example, as in the corymbose forms; or from the action of trichophytin on the sensitised skin-cells, since Bloch produced first a scarlatiniform erythema and later a typical lichenoid trichophytide by injection of trichophytin in a boy who had had a severe ringworm infection, but was cured.

We thus see how very closely in their pathogenesis the syphilides, tuberculides, and trichophytides are related. These infections may result in a high degree of allergy, whereby the tissue-cells, particularly of the skin, become sensitised, so that when the dissemination through the blood stream of the infective organism, or, in some cases, of its toxin—e.g., tuberculin and trichophytin—takes place, a variety of eruptions—or cutireactions—occur, representing defensive reactions against superinfection, and resulting in the destruction of the organism or toxin in situ.

D. The Streptococcides.

Some years ago, at a combined discussion on focal infection in relationship to dermatology, I proposed the name "streptococcides" to designate certain eruptions that I believed to be allergic reactions to streptococcal infection, and comparable to the tuberculides, syphilides, and trichophytides, and I drew up a comparative list, showing how the same type of cutaneous or subcutaneous reaction might result from these four infections. Unfortunately, Sabouraud[28] has recently employed the same word in a different sense, to indicate certain *external* streptococcal infections of the skin, and this is to be deplored, since, in my opinion, the termination "-ide" should be reserved for allergic reactions to micro-organisms or toxins reaching the skin via the blood stream.

The majority of the eruptions that I have labelled streptococcides belong to the erythema group, and include some like erythema multiforme and erythema nodosum which have long been noted to occur in association with rheumatic fever, or, like lupus erythematosus, with chronic rheumatoid arthritis.

Now the dermatologists are in exactly the same position vis-à-vis the eruptions I term "streptococcides" as the physicians are with regard to rheumatic fever, and for the same reason. Tuberculosis, syphilis, and ringworm are well defined and established diseases, and a definite diagnosis of one or the other can usually be substantiated. But the streptococcal group of organisms, some strains of which are normal saprophytes that are ever with us, is in a state of flux; strains that are in the laboratory apparently identical may have entirely different pathogenic properties, and a human being may die of one that is relatively innocuous to a mouse. It is often, therefore, impossible to furnish definite proof that a given condition is due to streptococcal infection, however strong the presumptive evidence may be, and it is almost as dangerous to draw conclusions from the effect of this or that method of treatment, as it is to infer that, because a pathogenic strain of streptococcus is found in some obvious focus of infection, it is necessarily the cause of a given symptom. Nevertheless, I believe the establishment of a group of streptococcides is justified by the evidence that has accumulated from independent sources during the last few years, evidence that is at least as strong as that upon which the theory of the streptococcal origin of rheumatic fever is based. If we accept it, then, just as Swift and others have drawn a comparison between tuberculosis, syphilis, and rheumatic fever as regards their evolution, and their clinical and pathological pictures, so may we compare the cutaneous manifestations of such well-defined infections as tubercle, syphilis, and ringworm with those of the less tangible streptococcal infections. The great interest of such a comparison lies in this fact, that, with certain types of cutaneous or subcutaneous reaction, not only are the clinical appearances much the same whatever organism is responsible, but the histological pictures are similar in form, showing that the various defensive allergic reactions to infective organisms may depend rather on the tissues affected than on the nature of the infection.

I emphasise this point because, although I agree with Adamson in believing that such distinctive eruptions as lichen planus, psoriasis, and pityriasis rosea must be due each to its own specific micro-organism, this view cannot, in my opinion, be maintained in the types of eruption we are now going to consider. They are, as Darier puts it, *syndromes* that may be provoked by more than one infection, their different morphological and pathological characters depending on the anatomical structures involved and in their situation, and not on the infecting organism responsible for them. Darier, for example, points out that not only may a lichenoid follicular syphilide be clinically identical in appearance with lichen scrofulosorum, but that histologically it may be impossible to differentiate between the two. On the other hand, the same infection may produce two or more of these eruptions at one and the same time.

Nature of the Eruptions.

Let us now consider seriatim some of these types of eruption—the exanthematides as I have called them. Their nature is indicated in Table I.

(1) *The Lichenoid Eruption.*

This is a polymorphic eruption consisting of small papules, some plane like those of lichen planus, but the majority follicular, varying in colour from pale yellowish-brown to bright red. The follicular papules may be capped by a horny scale or plug (one form of lichen spinulosus), or by a vesico-pustule. This

Type of eruption.	Syphilides.	Tuberculides.	Trichophytides.	Streptococcides.
Papular lichenoid, usually follicular.	Lichenoid follicular syphilide.	Lichen scrofulosorum.	Lichen trichophyticus.	Lichenoid follicular eruption—e.g., in association with streptococcal impetigo.
Eczematoid.	—	Dermatitis scrofulosa (eczema scrofulosorum).	Eczematoid trichophytide.	Eczematoid, or frankly eczematous dermatitis associated with focal streptococcal infection.
Erythema multiforme.	(?)	(?)	Erythema multiforme trichophyticum (Bloch, Rasch).	Most cases of erythema multiforme of the classical and particularly of the recurrent type.
Erythema nodosum.	Doubtful.	Yes.	Yes (Bloch, Sutter, Pulvermacher, Bruusgaard.	Probably the great majority of cases.
Erythema circinatum.	Circinate tertiary syphilide.	Yes. (Darier.)	—	Erythema annulare centrifugum.
Erythema scarlatiniforme.	—	(?)	Yes. (Sutter, Bloch.)	Erythema scarlatiniforme recurrens. Scarlet fever.
Erythema induratum.	Yes. (Ravaut, Tzanck and Pelbois, Pautrier and Darier.)	True Bazin's disease.	—	Non-tubercular form (Whitfield) "Nodosités rheumatismales."
Lupus erythematosus.	(?) according to some authors.	Yes.	—	Yes.

form is represented, as will be seen in the table, by lichen scrofulosorum, the lichenoid trichophytide or microsporide, and by the lichenoid follicular syphilide.

Now Whitfield[29] was, I believe, the first to describe an eruption occurring in association with streptococcal impetigo, usually, but not necessarily secondary to pediculosis capitis. Let me quote his own admirable description :—

"The first sign to be added to those of the simple impetiginous lesion is the eruption of extremely fine miliary papules, situated at the orifices of the hair follicles of the sides of the back of the neck extending down nearly to the clavicles. These papules appear to be produced by the erection of the hair follicles, and are at first slightly if at all reddened. They may remain in this stage until they subside, or they redden and even become covered with minute vesicles, though this is uncommon. They resemble closely, except as to situation, the papules of lichen scrofulosorum."

It will be seen how nearly the description corresponds to that of the lichenoid tuberculide, syphilide, or trichophytide. I have recently seen a patient with a widespread streptococcal impetigo of the face and neck; on stripping him, there was found on the back and chest an ill-defined erythematous eruption, associated with groups of tiny follicular papules. At his second visit, when his impetigo had almost subsided, all trace of this secondary eruption had disappeared.

(2) *The Eczematoid Eruption.*

There has been considerable discussion as to whether one is justified in describing an eczematoid tuberculide—the eczema scrofulosorum of the older authors. In 1920, Attwater, Marshall and I[30] described a series of cases of an eczematoid dermatitis, occurring almost exclusively in children and adolescents as scaly patches of a characteristic fawn or pale brown colour, usually dry, but sometimes oozing—probably as a result of scratching or rubbing—and situated chiefly on the extensor surfaces of the limbs, the trunk, and on the face, particularly on the temples and forehead below the margin of the hair.

In about 80 per cent. of the cases described Marshall and Attwater were able to demonstrate definite signs of active tuberculosis. I christened the eruption "dermatitis scrofulosa." In 1926, Dowling and I[31] described a further series of these cases, and we showed (1) that exactly similar patches may arise de novo, and persist for some time in tuberculous children at the sites where Pirquet's cuti-test with tuberculin has been done, and (2) that in children with dermatitis scrofulosa patches identical in appearance and histological structure with those already present may be produced by applying tuberculin to the skin. We also observed cases of undoubted lichen scrofulosorum, in which patches of dermatitis scrofulosa were coexistent, and put forward the view that the latter is an eczematoid variety of the former. I am also of the opinion that the so-called "fausse teigne d'Alibert" is merely dermatitis scrofulosa occurring on the scalp.

Some years ago a child whom I had treated in infancy for eczema was brought to me for scaly patches on the limbs and trunk, which were characteristic of dermatitis scrofulosa, accompanied by slight generalised enlargement of the lymphatic glands. The practitioner in charge of the case was entirely sceptical of my opinion that the child had active tuberculosis, but a week later there occurred an outbreak of typical lichen scrofulosorum, and the late Dr. J. J. Perkins confirmed the diagnosis of tuberculous adenitis.

Hügel, Eliascheff, and Schaumann[32] have recorded cases of lichen scrofulosorum in which the normal papular eruption was associated with "brownish red scaly patches of psoriasiform aspect." Schaumann found in microscopical sections infiltration with epitheloid and giant cells around the follicles.

Comparable to dermatitis scrofulosa is, I think, the eczematoid trichophytide described by Jadassohn and Guth, and the eczematoid microsporide by Finnerud.[33] It is generally agreed that they are varieties of the lichenoid trichophytide or microsporide, just as dermatitis scrofulosa may be regarded as a variety of lichen scrofulosorum. I believe that these eczematoid eruptions are due to the sensitisation of the epidermal cells to the toxins—tuberculin and trichophytin respectively—and the artificial production of dermatitis scrofulosa by applying tuberculin to the skin is in favour of this view. The other tuberculides and trichophytides, with the possible exception in some instances of the lichenoid varieties, are, of course, held to result from embolism of the actual organism, dead or living, and not to their toxins.

Can we recognise a comparable eczematoid streptococcide? I think we can with reasonable certainty. Whitfield remarks in his description of the lichenoid eruption associated with streptococcal impetigo of the scalp :—

"In some cases the secondary eruption is limited to this but in others there occurs, after a variable number of days an acute outbreak all over the chest, abdomen, and shoulders of an annular or figurate erythematous eruption with secondary scaling, such as would be classed in the ordinary way as a circinate seborrhœic eczema of the trunk."

This description tallies exactly with the description of eczematoid trichophytide and microsporide given by Guth and Finnerud respectively.

Like dermatitis scrofulosa this toxic eruption must be distinguished from the scaly, dry form of impetigo. Moreover, Whitfield,[34] Sutton,[35] Visher,[36] myself and others have drawn attention to eczematous eruptions associated with focal sepsis elsewhere—e.g., in the teeth or tonsils—in which the infective organism responsible usually seems to be a streptococcus.

To sum up—generalised eruptions of the lichenoid and, to a great extent, follicular variety, may occur in syphilis, tuberculosis, and trichophytosis, and, as a variant, an eczematoid form of dermatitis due to epidermal sensitisation can be recognised in the last two; eruptions similar in type occur in cases of focal streptococcal infection in the skin itself or elsewhere.

(3) *Erythema Multiforme.*

Unfortunately, the term erythema multiforme has been, and still is, used loosely to designate a variety of erythemato-urticarial and sometimes purpuric eruptions occurring, for example, after the ingestion of certain foods or drugs, and the injection of foreign sera. I would restrict it to an eruption which possesses definite enough clinical features, although few, I think, would claim it to be ætiologically specific.

Clinically, it is characterised by a symmetrical eruption of nummular erythematous papules, usually when fully developed of a characteristic dark lilac hue in the centre, pink or vermilion red at the periphery. To the touch they give a curious sensation like that of a rubber cap stretched over the mouth of a bottle full of fluid.

Numerous variations from this simple lesion may occur; thus the central portion may disappear leaving a ring (erythema annulare) which by excentric spread and intersection with similar rings may produce gyrate figures (erythema gyratum). Owing to the intensity of the serous exudation, vesicles or bullæ may form in the centre, and around these arise rarely the multi-coloured rings—erythematous or vesicular—giving the variety known as erythema or herpes iris; or from actual hæmorrhage the lesions may be purpuric.

The distribution is almost invariably the same, the backs of the hands, wrists and forearms, the elbows and knees, the dorsa of the ankles and feet, and the face being the sites of election. Sometimes the palms and soles are involved, the thick horny layer in these situations somewhat obscuring the characteristics of the papules. True erythema multiforme is one of the relatively few eruptions that affect the mucous membranes, particularly those of mouth, conjunctiva and vulva, and probably of the stomach and intestines, in view of the acute gastro-intestinal crises, so well described by Osler, that may rarely accompany the eruption.

Ætiology.—Excluding the rare cases of apparently classical erythema multiforme provoked by certain foods and drugs, and by infections such as gonorrhœa and enteric, or occurring after vaccination, we may say that several observers have stressed its association with manifest tuberculosis, and both Bloch and Rasch have described typical outbreaks in the course of suppurating ringworm, although at least one of Bloch's cases is open to question. But in the vast majority of cases of true erythema multiforme the eruption, I am convinced, is a manifestation of an acute or chronic infection with a streptococcus; particularly is this true of the recurrent form in which the mucous membrane of the mouth is usually involved, and in which acute attacks occur at intervals of from a few weeks to a year or more. In some cases the mucous membranes alone are involved, and the true nature of the attacks is often not appreciated until, perhaps, in one the cutaneous eruption appears.

For example, some years ago I was asked to see a girl who was supposed to be suffering from a syphilitic affection of the vulva and mouth, although the Wassermann reaction was negative. Inquiry revealed the history of former similar outbreaks, sometimes accompanied by a "rash" on the arms. Later she was admitted to hospital under my care for investigation, and very obligingly developed an attack of the oral and vulval lesions and an outbreak of generalised erythema multiforme, following a sore-throat with pyrexia. The tonsils, which were an obvious source of infection, were subsequently enucleated, and an autogenous vaccine from a streptococcus isolated from them was given; some weeks after her discharge she returned with a recurrence of her mucous membrane lesions and a typical eruption of *erythema nodosum* on the shins, which followed shortly after an injection of her vaccine. She ultimately ceased to have her attacks, but was kept under observation for some two years.

A considerable number of these recurrent cases have been investigated by me in association with Eyre, Knott, and Bulleid. In some of these investigation has been very complete, and the patients have been watched over long periods. Our experience may be summarised as follows: (1) There has usually been present some obvious source or portal of entry of infection, usually the nasopharynx and tonsils or the teeth, from which a predominant strain of streptococcus has been isolated. (2) Specific agglutinins to this strain have been found in the patient's serum. (3) Injection of a vaccine of the pathogenic streptococcus has in the majority of cases provoked at first abortive attacks of the erythema multiforme; this, I am aware, is not conclusive evidence of the specificity of the vaccine, but, as a control, other vaccines have been given without this result, and these focal reactions have been a very striking feature in these cases. (4) Of all the therapeutic methods employed—e.g., autohæmotherapy and non-specific protein injections—eradication or local treatment of the main source of infection followed by specific vaccine therapy over a long period has given the best results.

From a study of these cases of recurrent erythema multiforme, and of the conditions apparently due to chronic streptococcal infection, it would appear that the patient becomes infected by, and sensitised to, a strain of streptococcus which to him is specific, and which can often be recovered from various mucous surfaces—mouth, nasopharynx, and intestine. The presence of a "closed" focus of sepsis is by no means necessary; apart altogether from the tonsils, for example, the mucous membrane of the nasopharynx may be a potent source of infection. Apart from the presence in his blood of agglutinins specific for this particular strain, injection of it, even in small doses, may provoke a sharp general and focal reaction, exactly comparable to those induced by tuberculin in a person sensitised to tubercle, whereas he will tolerate quite large doses of other strains recovered from his own mucous membranes or from other patients.

The association of erythema multiforme with acute rheumatic fever, or with rheumatoid arthritis, is, to my mind, beyond question; I have seen it too often, both in my pre-dermatological days and since, to have any doubt on this point. Although the eruption both in its simple and recurrent form is usually not of serious significance, it may be so. Thus, some years ago, a child, at my request, was admitted to hospital for an acute attack of erythema multiforme, with swelling of the joints, following tonsillitis; endocarditis and pericarditis supervened, a streptococcus was obtained on blood culture, and the child died in a few weeks.

Quite recently a girl of 18 years was admitted under my care for erythema multiforme, of characteristic appearance and distribution, except that many of the lesions were purpuric. She had had recurrent attacks of tonsillitis during the previous six months. Shortly after admission another attack developed, accompanied by considerable fever, and with this a scarlatiniform erythema appeared on the face, limbs, and trunk, the erythema multiforme lesions being still present on the backs of the hands. There was an apical systolic bruit with dilatation of the left ventricle. Later an indurated area of cellulitis arose on the back of the neck, which broke down and discharged pus; from this an acute erysipelas spread downwards over the shoulders and back to the buttocks; in the centre of the back a considerable area of skin became gangrenous, and around this large bullæ formed. Pus from the original site of cellulitis gave a mixed growth of *Streptococcus pyogenes longus*, *Staphylococcus aureus*, and *Bacillus xerosis*; from the serous exudate in the lumbar region a pure growth of *S. pyogenes longus* was obtained.

In spite of injections of scarlatinal antistreptococcal serum the patient's condition grew steadily worse, and she died.

Post Mortem.—Soft vegetations were found on the posterior wall of the left ventricle, extending to the edge of the posterior cusp of the mitral valve, and covering the chordæ tendineæ and the apices of the papillary muscles. There was no evidence of previous valvular damage. The other findings

were those of an acute septicæmic infection—petechial hæmorrhages, staining of the intima of the heart and large vessels, fatty degeneration of the heart muscle and liver, and cloudy swelling of the kidneys, with three small recent white infarcts in the right one.

The points of interest in this case are: (1) The repeated attacks of tonsillitis associated with erythema multiforme of the purpuric type. (2) The simultaneous appearance of a scarlatiniform erythema with the erythema multiforme after her last attack of tonsillitis. (3) The development of an acute erysipelas followed by streptococcal septicæmia, with vegetations in the heart.

Another patient—a girl aged 17—came to me in November with a similar eruption of erythema multiforme of the purpuric type, associated with swelling of the left knee-joint, following tonsillitis. She refused admission, but consented after a second attack three weeks later, which subsided in hospital. On Feb. 7th she came again with a fresh outbreak of the eruption, and swelling of the left knee and right elbow-joints; in the interval both knees and elbow-joints had been swollen periodically.

(4) *Erythema Nodosum.*

What I have said concerning the ætiology of erythema multiforme is applicable also to erythema nodosum. These two terms should be reserved for well-defined types of eruption, the lesions of which are respectively characteristic in their appearance, distribution, and evolution. They are *clinical* entities, but they are not specific *morbid* entities. If this fact were only realised, all the discussion that has arisen as to the nature of erythema nodosum, and its relationship to rheumatic fever and tuberculosis, would cease. It is quite futile to attempt to restrict the term erythema nodosum to the "specific and separate disease" of which Trousseau wrote, or the "nodal fever" of Lendon,[37] and to deny, as many have done, its association with rheumatic fever, or its relationship to erythema multiforme. Odery Symes,[38] who is one of the sincerest exponents of this doctrine, himself described a remarkable family with a strong history of rheumatic fever on both sides, in which the mother had erythema nodosum, the eldest daughter developed the eruption after tonsillitis with arthritis, endocarditis, and pericarditis, and died; the fourth daughter had two, and the fifth and sixth daughters three attacks of erythema nodosum at intervals varying from one to five years. Surely Symes cannot hold that all these attacks were "nodal fever," a disease that is supposed to confer immunity? This familial incidence is occasionally met with in recurrent erythema multiforme, and two of my patients with this condition were twin sisters.

Symes will not admit that true erythema nodosum occurs in association with erythema multiforme, although he grants that "lesions on the fronts of the shins, resembling the nodes of erythema nodosum" may occur with the latter eruption, but I have seen absolutely characteristic erythema nodosum coexistent with erythema multiforme, and, as in the case already referred to, they may alternate in the same patient. With regard to the so-called nodal fever of Lendon, what astonishes me most is that none of those who have described cases or groups of cases under this term have apparently made any attempt to investigate the bacteriology of the condition. From the results of such investigation in other cases, it is probable that they are of streptococcal origin—possibly caused by a specific strain; the apparent infectiousness is not against this view, since certain strains of streptococcus are definitely contagious—e.g., that of scarlet fever and erysipelas.

The evident relationship in some instances between erythema nodosum and tuberculosis, which is granted even by the adherents to the "nodal fever" conception, has been widely discussed. It is clear, I think, from the critical survey of the literature—even neglecting the claims of Landouzy[39] and his collaborators to have demonstrated a tubercle bacillus in a vessel of a nodule, and to have tuberculised a guinea-pig with another portion of the same nodule—that erythema nodosum is definitely in some cases a tuberculide, but I believe it to be rarely so. That it is sometimes—in the great majority of cases in my opinion—a streptococcide is more certain, and positive blood cultures have been obtained in several cases.

Lastly, it is a rare form of *trichophytide*. In Bloch's first case there was an associated lichenoid trichophytide; the nodular lesions were indistinguishable from ordinary erythema nodosum, and gave a strong focal reaction after injection of trichophytin. Other similar cases have been published, but the most remarkable is that of Bruusgaard. He excised a very early nodule and was not only able to demonstrate the spores of the fungus in microscopical section, but actually succeeded in cultivating the ringworm fungus from this and other nodules, thus proving the hæmatogenous spread of the organism.

To sum up—erythema nodosum, like erythema multiforme, is not a specific morbid entity; it is probably in the majority of cases of streptococcal origin, less commonly a tuberculide, and it may rarely be a trichophytide.

(5) *Lupus Erythematosus.*

Although I have included lupus erythematosus among the eruptions, for which the general termination "ide" is employed, it clearly differs in nature from such conditions as the papulo-necrotic tuberculides and erythema nodosum or induratum, for the individual lesions tend to persist, and to spread peripherally, although they may in parts undergo spontaneous resolution with or without scarring. Clinically can be recognised:—

(1) The common form of the eruption, consisting of one or more indolent patches, varying in their degree of infiltration and their tendency to cicatricial atrophy: this is the fixed or discoid type.

(2) A subacute form in which the patches are more numerous and more widely distributed—usually symmetrically in regions where vascular stasis is most apparent—e.g., the "butterfly" area of the face, the ears, the V-shaped area over the manubrium sterni, and the hands, ankles, and feet.

(3) The acute form which usually succeeds the subacute and less commonly the fixed form, but may arise, as in the cases published by Pernet,[40] de novo. In this form the recent lesions are clinically hardly distinguishable from those of erythema multiforme. A large percentage of the cases die.

The ætiology of lupus erythematosus has been, and still is, the subject of much discussion and of experimental investigation. Civatte[41] in France, and Gray[42] in this country, have recently reviewed the whole subject. As with erythema nodosum, there are three opposing views: (*a*) That it is invariably of tuberculous origin. Ehrmann and Schaumann uphold this view, although their explanations of the genesis of the eruption differ. (*b*) That it is not a specific morbid entity, but may be produced by more than one infective organism or toxin. This, I believe, is now the commonly accepted view. The tubercle bacillus and a streptococcus are the organisms that have been held responsible more than any other. (*c*) That it is a specific infective disease, which is often accompanied or complicated by tuberculosis and streptococcal infection. This is the view put forward by Gray.

I cannot enter into a detailed discussion of these three theories. Although I am responsible for having expounded the streptococcal origin of the eruption in some cases, I am satisfied that in others tuberculosis is responsible, the proportion between the two groups of cases probably varying in different countries, and thus accounting, to some extent, for the difference in opinion about the relative ætiological importance of tuberculosis. In favour of a tuberculous origin, we have clinically the association of the eruption in some patients with manifest old or active tuberculosis and its coexistence with undoubted tuberculides, such as folliclis; and experimentally the claims of Gougerot,[43] Ehrmann and Reines,[44] Bloch and Fuchs,[45] and more recently Cannon and Ornstein,[46] to have produced tuberculosis in guinea-pigs by inoculation of tissue from lupus erythematosus lesions. Cannon and Ornstein, for whose work I have great respect, were successful in five cases of the disease out of 23.

Numerous authors have reported focal reactions after injection of tuberculin, and even acute generalised outbreaks have been thus provoked.

Dyson,[47] rubbed tuberculin and streptococcal ointments into the lesions in a number of cases, and out of 43 patients tested with tuberculin 30, or 68 per cent., gave positive reactions; of eight cases tested with streptococcal ointment 3, or 35 per cent., were positive.

That tuberculosis is, however, not the invariable cause would appear certain from the published post-mortem records of acute fatal cases, in which little or no trace of tuberculosis was found after the most careful search. Schaumann's attempt to reconcile this with his view that the eruption is always tuberculous is too complex to discuss now. The majority of fatal cases published recently have apparently died of streptococcal septicæmia, in some a pure culture of a streptococcus has been obtained from the blood during life, as in those recorded by Sibley[48] and Gibson.[49] Gray suggests this may have been due to a terminal infection, although in one of his own cases, in which a positive blood culture was obtained, the patient recovered.

Without pursuing the discussion further, I would emphasise the clinical similarity between erythema multiforme and lupus erythematosus, which was remarked upon by Galloway and MacLeod[50] many years ago. In the more acute forms of the latter, as I have said, the lesions are indistinguishable from those of the former, and both eruptions involve the mucous membranes of the mouth and conjunctiva. It is of interest, too, that, whereas erythema multiforme is not uncommonly associated with rheumatic fever, lupus erythematosus sometimes accompanies chronic rheumatoid arthritis. The eruption of erythema multiforme, although liable to recur, disappears without leaving any trace, and in rheumatic fever, though recurrence is the rule, the joints recover completely; lupus erythematosus, on the other hand, tends to persist and to produce scarring, just as rheumatoid arthritis is essentially chronic and liable to cause permanent damage to joint structures. One of the worst and most intractable cases of lupus erythematosus I have ever had under my care has mitral and aortic valvular disease dating from childhood, with auricular fibrillation, chronic rheumatoid arthritis chiefly of the finger-joints, and extensive lupus erythematosus of the face neck, and hands. The eruption has remained entirely unaffected by injections of sanocrysin and krysolgan, which are strikingly successful in the majority of those cases of the disease in which tuberculosis is the probable underlying cause.

(6) *Erythema Induratum.*

Under this term are included two types of indolent subcutaneous nodule.

The first type is merely a variety of the so-called hypodermic sarcoid, and is a subcutaneous tuberculide; commonly known in this country as Bazin's disease, it is seen almost exclusively in young girls with the condition of the legs that I described in my first lecture under the term "erythrocyanosis crurum puellaris"—i.e., fat, blue, œdematous legs, in which there is vascular stasis, most evident on the posterior external surfaces of the lowest third. Since the nodules of erythema induratum are of embolic origin, they occur most commonly, as one would expect, on the above area. The nodules may slowly resolve or may rupture and exude an oily fluid, the product of fat necrosis; in the latter case indolent ulcers, which become secondarily infected with pyogenic organisms, result. I believe that all genuine cases of this type are tuberculous; numerous successful animal inoculations with material from the nodules have been made both in this country and abroad; the patients give strongly positive cutaneous and intracutaneous tests with tuberculin, and marked focal reactions if this be injected. Like lichen scrofulosorum nodules may arise for the first time in a tuberculous person after a therapeutic injection of tuberculin. Not uncommonly, papulo-necrotic tuberculides and erythema induratum coexist in the same patient.

The second type was well described by Whitfield[51] many years ago. The lesions, I think correspond to the "nodosités rheumatismales" of the French. Whitfield says that he has seen it "exclusively in women of from 35–45 years of age, who have suffered from chronic rheumatism supervening on typical acute rheumatism" and he believes "that they are the result of septic absorption, often from the teeth."

I have recently seen a case of this sort in a middle-aged man, who consulted me for an indolent subcutaneous nodule above the right ankle, with considerable brawny œdema around it; later, several fresh smaller nodules appeared on the lower parts of both legs. He was found to have apical infection of several dead teeth, with considerable involvement of alveolar bone. These teeth were extracted, and a vaccine prepared from a streptococcus isolated. The nodules gradually disappeared, but a fresh one appeared after the third dose of vaccine. There has been no further recurrence.

It is possible, as Guy[52] suggests, that other organisms apart from the tubercle bacillus and a streptococcus may produce similar embolic subcutaneous lesions.

Pathological Anatomy.

A study of the pathological anatomy of these allergic eruptions is of extreme interest, but I can only deal with it very briefly. As might be expected, the changes are for the most part centred round the vessels either of the dermis or hypodermis. A comparison may well be made between the histological picture presented by some of these lesions and that of Aschoff's nodules in the myocardium of cases of acute rheumatism, and of the subcutaneous nodules, both of this disease and of chronic infective arthritis, which, as Carey Coombs[53] emphasises, must also be of embolic orgin.

One may ask upon what depends the differences between these various types of eruption, seeing that some of them can be provoked by widely different organisms; or, for that matter, why does the circulation of the same organism—e.g., the tubercle bacillus—give rise in some cases to a lichenoid eruption, in others to a papulo-necrotic lesion, in others to an erythema induratum or nodosum? I think the chief factor determining the type of lesion is the localisation of the embolised organism or the action of its toxin.

In eruptions such as the roseola of syphilis the organism presumably comes to rest in the superficial capillaries of the skin; in the lichenoid eruptions, the inflammmatory reaction is also superficial, in the papillary body or more particularly around a pilosebaceous follicle; in the papulo-necrotic type it is deeper in the dermis. In erythema nodosum and erythema induratum the reaction takes place around a vessel in the subcutaneous tissue. From the observations of Hadfield, recorded in Symes's recent book, made on material supplied by the latter, it appears that the essential lesion in erythema nodosum is "an acute and widespread *arteriolitis* in the subcutaneous fat, resolving rapidly without suppuration." His statements that a recent lesion "showed all the phenomena of acute inflammation, such as follows the actual presence of pyogenic cocci in the subcutaneous tissue," and that "it would have been permissible from an examination of the recent lesion alone to form the opinion that suppuration was likely to occur in it," are of great interest. They suggest that in the cases from which the material was taken were of streptococcal origin. Hadfield failed to find cocci, and he concludes that the lesion is "due to a circulating toxin," but this opinion does not take into account the essential nature of these allergic eruptions—namely, the rapid destruction of embolised organisms.

In erythema induratum Schaumann has adduced evidence to show that the embolism occurs in one of the vasa vasorum of a subcutaneous vein—the lesion being essentially a *phlebitis*.

In both erythema nodosum and erythema induratum there is extensive fat necrosis, the products of which are absorbed by histiocytes and giant cells.

Factors Predisposing to the Occurrence and Localisation of these Eruptions.

I have already indicated, when discussing the tuberculides and trichophytides, that there are two factors essential for the occurrence of these and similar eruptions—namely, the presence of the causal organism or its toxin (the antigen), and the sensitisation of the tissue cells in the skin or subcutaneous tissue—i.e., the presence in them of antibodies. The various lesions constituting the eruptions are inflammatory reactions resulting from contact of the antigen with the antibodies of the specifically sensitised cells. This phenomenon constitutes "allergy" in the sense originally employed by Pirquet; of late, however, the term has been given a wider significance, as I shall point out in my next lecture, although its essential meaning remains the same.

As Bloch[54] says: "It is clear that an organism which possesses or has acquired (by previous contact) such specific antibodies, will react to the application of the specific antigen differently from an organism which does not possess such antibodies (allergy = different reaction)." Bloch also makes the following deduction, which to my mind is of fundamental importance, both with regard to the eruptions we have been considering and to allergic reactions in general: "The type and course of the allergic reaction are independent of the nature of the antigen, but vary according to the localisation of the antibody—that is, according to which organ reacts to the antigen."

Now until recently it has been held that in true anaphylaxis and allergy the antigen must be a protein, but this view is no longer tenable; it is, in fact, highly probable that the actual specific antigenic bodies, no matter what their source, are non-protein substances of relatively simple chemical composition. This question I shall refer to also in my next lecture. For our present purpose, if this be accepted, it is clear that it is of no consequence whether the various eruptions—tuberculides, trichophytides or streptococcides—are produced by the actual causal organisms, or by their toxins, circulating in the blood stream, and reaching the sensitised tissue of the skin or subcutaneous tissue, since the antigenic substance is presumably present in both. Given, however, the *essential* factors for the production of these eruptions—namely, sensitisation of the cutaneous or subcutaneous tissues, and the access to them via the blood stream of the specific antigen—there are, nevertheless, certain other factors predisposing to their occurrence and distribution. Of these I think the most important are: (1) circulatory stasis in the skin and subcutaneous tissue of certain areas; and (2) the action of physical agents such as light, heat, and cold.

This question has been dealt with by Adamson,[55] both in his Goulstonian Lectures and in a more recent communication, and by Lewis[56] in his work on the blood-vessels of the human skin.

It is obvious that, in the case of eruptions dependent upon circulatory micro-organisms or their toxins, stasis in the blood-vessels of a given area will predispose to the embolism of the former or the more prolonged noxious action of the latter. This influence of circulatory stasis is clearly seen in erythema induratum, in the papulo-necrotic tuberculides, in lupus erythematosus, and to a less extent in erythema multiforme and nodosum. Moreover, Adamson has suggested that the roseolar and papular eruptions of secondary syphilis arise at the angles of the vascular network, demonstrated many years ago by Renault—i.e., at the sites of maximum capillary stasis. This network is revealed in certain subjects by exposure of the skin to cold (livedo annularis), or to prolonged heat (erythema or ephelis ab igne), both of which agents increase the stasis in the vessels of low tone farthest away from the central arteriole. Lewis has shown that these vessels are irresponsive to adrenalin and refractory to histamine.

The second factor—namely, the action of light in determining outbreaks and the localisation of certain of these eruptions, is illustrated by some cases of erythema multiforme and lupus erythematosus.

One of my patients with recurrent erythema multiforme, who formerly had frequent attacks, now has one annual attack, which invariably occurs when she first exposes herself to strong sunlight in spring or early summer.

Another, a little girl, whose erythema multiforme began after scarlet fever, was always free in winter, but developed fresh lesions every time she was exposed to sunlight. She was comparatively free last summer, after enucleation of septic tonsils and subsequent vaccine treatment. In her case there was little doubt that her skin became sensitised to a *Streptococcus longus* at the time of her scarlet fever. This provoking action of sunlight is also seen in some cases of lupus erythematosus.

Significance and Value of the Cutaneous and Intracutaneous Tests.

When we survey the problem of rheumatic fever and rheumatoid arthritis on the one hand, and of some of the eruptions with which I have just dealt—such as erythema multiforme, erythema nodosum, and lupus erythematosus—on the other, we are struck by one very significant fact—namely, that the chief point of controversy concerning their ætiology centres round the streptococcal group of organisms. Personally, I am satisfied that erythema multiforme of the classical type and erythema nodosum are, in the majority of cases, streptococcides, and that the latter, at any rate, may less commonly be a tuberculide; with regard to lupus erythematosus, I think the evidence that it is sometimes of tuberculous origin is conclusive, and, since in 1915 I first put forward the view of its streptococcal origin in certain cases, confirmatory evidence has accumulated in favour of my claim. I believe that it is often possible clinically to distinguish between the tuberculous and the streptococcal form from the appearance of the eruption.

I have already referred to the difficulty of establishing beyond question the streptococcal origin of a given eruption, or, for that matter, of general diseases such as rheumatic fever or rheumatoid arthritis. I think, however, that valuable evidence might be obtained by carefully controlled intracutaneous tests with emulsions or preferably filtrates of streptococci, such as have been employed by Birkhaug,[57] Strauss,[58] Kaiser,[59] Swift and his co-workers, in their researches on rheumatic fever. This leads me, however, to a consideration of the whole question of diagnostic cutaneous tests with tuberculin, trichophytin, and similar extracts.

With regard to the tuberculin test, I agree with Burhans[60] and Lyle Cummins[61] that the intradermal method of Mendel[62] and Mantoux[63] is preferable to the cutaneous test of Pirquet. I believe that the significance of these tests is widely misunderstood, and it is for this reason that by many they are regarded as comparatively useless. To my mind they afford evidence of one thing and one thing only—namely, that the skin is sensitised to the specific antigenic substance of the infective organism in question. It follows that a positive reaction indicates that an infection with the particular organism has taken place and that there is cutaneous allergy towards it; a negative one excludes the latter, but *not* the former. Lyle Cummins says: "Tuberculin sensitivity is at its height in healthy but infected adults, and is still high in those tuberculous persons in whom the disease is taking a relatively benign course, and it tends to diminish with the gradual deterioration of health consequent on advancing tuberculosis." This statement is true, but it does not emphasise the real meaning of his observations. Since a positive cutaneous or intracutaneous reaction is an index of the degree of cutaneous allergy, it follows that the higher the latter the stronger the reaction. As one would expect, therefore, it is in patients with tuberculide eruptions, which depend for their occurrence on an allergic state of the skin, that some of the strongest reactions are obtained.

As I shall point out later, cutaneous allergy is a protective mechanism against more serious visceral involvement; it disappears for a while after acute infections such as measles, during which time also

the Pirquet and intradermal tests become negative; and in advanced cases of tuberculosis, when the protective function of the skin has failed, these tests diminish in intensity.

Colliver[64] has shown that in tuberculosis the Pirquet test, if positive, gives the same degree of reaction in different areas, but this is not so in trichophytosis, in which, of course, the primary site of infection is always in the skin itself. This is shown by the experiments of Pedersen[65] and of Sutter[66] with trichophytin.

Pedersen tested nine cases of suppurating ringworm without secondary trichophytides, with trichophytin by Pirquet's method. All gave positive reactions on the abdomen, seven were positive on the arm, and only four on the leg. The abdomen is one of the chief sites of election for the trichophytide eruptions. Pedersen also tested six cases in which secondary trichophytides were present. All were positive on the abdomen and upper arm where the trichophytides were situated, and only two on the leg where there were no trichophytides. He and Sutter both showed that the cutaneous reaction was always strongest near the site of the suppurating ringworm infection.

From their analogy to the tuberculides and trichophytides the eruptions that I have termed streptococcides should be accompanied by a simliar cutaneous allergy towards streptococcal antigen, and positive cutaneous or intracutaneous tests should be obtained with it. An obvious difficulty, however, is the question whether the actual antigenic substance is common to the streptococcal group as a whole, or whether different strains have their own specific substance.

I have already referred to the tests carried out by several workers with emulsions or filtrates of streptococci in rheumatic patients. Recently Forman, in my clinic, has made intradermal tests with streptococcal emulsions, using staphylococcal emulsions and normal saline as controls, in patients with eruptions that I consider to be streptococcides, in apparently normal subjects, and in patients with other diseases. So far as our observations go, this line of research has given significant and promising results.

The Rôle of the Skin in the Defensive Mechanism of the Body.

I have already referred to the importance of impaired function of the skin as a predisposing factor to the development of rheumatic conditions, and in my first lecture I emphasised the relationship between the skin and the activity of the endocrine glands, particularly the adrenals and thyroid, and of the autonomic nervous system, upon which the resistance of the tissues to certain bacterial infections, as Cramer's work suggests, appears largely to depend.

Llewellyn, Gordon, and Gunzberg, in their remarks at the Bath Conference, all laid stress on the symptoms of disordered cutaneous circulation and sweat secretion that are so apparent in rheumatic subjects, and Langdon Brown, Thomson, Pringle, and Strauss dealt with the endocrine factors.

I think it will be generally admitted that, apart from removal and treatment of definite sources of infection, and the employment of vaccines in suitable cases, the methods of treatment in chronic rheumatic conditions which have proved of most value depend very largely, as Howitt[67] has recently emphasised, on stimulation of the skin, whether by increasing the secretion of sweat, or by flushing the cutaneous blood-vessels, or by producing in it a definitely inflammatory reaction, as with erythema doses of ultra-violet light, or the deliberate application of irritant substances. By these various methods one can utilise the excretory function of the skin, increase tissue oxidation, stimulate the adrenal-thyroid-sympathetic system, as by alternate hot and cold douches, and lastly produce what is apparently mild protein shock, which, after a preliminary leucopenia, leads to a considerable leucocytosis and an increase in the bactericidal power of the blood. It is my contention that susceptibility to active infection with the less virulent types of streptococci, as well as with some other organisms, such as the tubercle bacillus, is dependent largely on the prevention of the normal physiological functions of the skin by the unnatural conditions imposed by civilisation, and that by far the most effective treatment for such infection, when it has occurred, is the restoration of those functions by all the means at our disposal.

Apart from this, however, in conclusion I would raise a question that to my mind is of profound interest and importance—namely, that, when active infection is present, to what extent do the cutaneous manifestations of such infection constitute a protective mechanism against invasion of deeper and more important organs? May not the rashes of the acute exanthemata, and of the more chronic infections such as syphilis and tubercle, represent part, at any rate, of the body's campaign against the invading organism, since, as we know, they represent antigen-antibody reactions designed to destroy the former in situ? May not, in fact, recovery from an acute exanthem be partly dependent on the rash?

The evidence in favour of this view is very strong. The popular conception of most skin eruptions is that they represent an effort to drive out some poison from within, and anxiety is often expressed about the danger of driving it in again! We should not be too ready to dismiss this idea as an ignorant superstition. Brocq[68] has long upheld the view—earning for himself much scorn in so doing—not only that certain eruptions alternate with various visceral and nervous disorders, which is an indisputable fact, but that the successful treatment of the former may precipitate an attack of the latter, which in turn may be promptly relieved by exciting an inflammatory reaction in the skin. On this idea depend the older methods of treatment by blistering, setons, cupping, scarifications, and the like. We now attempt to treat the underlying infection or toxæmia, on which both the cutaneous and visceral symptoms depend.

In tuberculosis it has long been recognised that patients who suffer from tuberculides and lupus vulgaris are comparatively immune to the more deadly forms of this disease, such as actively progressive phthisis. According to Burnet,[69] it is probable that the skin of all the tissues is that which lends itself best to the spontaneous attenuation of the tuberculous virus. "It is not a matter of indifference," he says, "for a tubercular person that his skin be affected before his lung, or his lung before his skin, and his phthisis is without doubt not the same as if his skin were not involved." Moreover, we know that should the severer forms of visceral involvement, or a general miliary tuberculosis supervene in a patient with tuberculides or lupus, the skin lesions automatically disappear, and the Pirquet reaction—the index of cutaneous allergy—often vanishes with them.

In syphilis it is common knowledge how seldom tabes and general paralysis occur in those who have had severe cutaneous manifestations. Years ago when I was investigating the histories of large numbers of tabetics, I was struck by the fact that few of them retained any recollection of a syphilitic eruption. Moreover, the recent publication by Bruusgaard[70] must give us pause. His predecessor, Boeck, always taught that mercury and iodide were symptomatic remedies, which not only fail to cure the disease, but actually paralyse the body's natural defences, so that when they are administered the infection runs an atypical course, and is much more liable seriously to damage internal organs, particularly the central nervous system. This, of course, was in the pre-salvarsan days. Boeck only employed these drugs in cases in which the disease failed to run its natural course. Bruusgaard and Dählstrom in an exhaustive analysis of Boeck's old patients (some of whom, no doubt, did receive mercury and iodide from other doctors), found that only 0.6 per cent. developed general paralysis, as compared with the usual computation of 4 per cent.

In ringworm (trichophytosis) we know from Bloch's experiments that immunity to reinfection is a function

of the allergic condition of the skin cells. In human favus the cuti-reaction is almost always negative, showing that to this fungus (*Achorion schönleinii*) the skin fails to develop antibodies; this fact may well explain why human favus is a chronic disease without any tendency to spontaneous cure.

Lastly, when we come to the eruptions that in my opinion may legitimately be termed rheumatic, or at any rate streptococcides, cannot we detect the same protective rôle against visceral damage? Those, who like Gosse,[71] Lendon, and Symes, base their opinion that erythema nodosum is not a rheumatic disease on the fact that it is comparatively seldom associated with permanent damage to the heart or with chorea, and that it infrequently recurs, have, I believe, failed to grasp the whole story of rheumatic infection, and to understand the significance of its cutaneous manifestations. One might equally well argue that gummata are not syphilitic because they so seldom occur in tabetics and paralytics, or vice versa. That erythema nodosum *is* sometimes associated with typical rheumatic fever and its cardiac complications is certain. That the association is not more frequent is, I submit, because as with the tuberculides and syphilides, the allergic state of the skin on which it depends protects the more vital organs. The same may be said of erythema multiforme.

Conclusions.

(1) My conclusions are that one may justifiably compare tuberculosis, syphilis, and rheumatism.

(2) That there is increasing evidence that rheumatic fever and some of the chronic forms of rheumatic disease are due to streptococcal infection.

(3) That certain cutaneous manifestations of these three infections and of the severer forms of ringworm are comparable and sometimes indistinguishable; and that they depend on an allergic condition of the skin.

(4) That this allergic condition of the skin is to some extent a protective mechanism against involvement of more vital organs.

(5) That interference with the normal physiological functions of the skin, such as is bound to occur in the majority of persons living under civilised conditions, is an important factor in predisposing to active infection with certain organisms, such as the tubercle bacillus, and with the common saprophytes of the mucous membranes and skin.

References.

1. Poynton, F. J., and Paine, A.: THE LANCET, 1900, ii., 861. 932.
2. Small, J. C.: Amer. Jour. Med. Sci., 1927, clxxiii., 101.
3. Birkhaug, K. E.: Jour. Infect. Dis., 1927, xl., 549.
4. Lazarus-Barlow, P.: Proceedings of Conference on Rheumatic Diseases, Bath, 1928, p. 152.
5. Swift, H. F., Derick, C. L., and Hitchcock, C. H.: Ibid., p. 157.
6. Swift, H. F.: Amer. Jour. Med. Sci., 1925, clxx., 631.
7. Bezançon, F., and Weil, M. P.: Ann. de Méd., 1926, xix., 81.
8. Calmette, A.: L'infection Bacillaire et la Tuberculose chez l'Homme et chez les Animaux, Paris, 3rd edit., 1928, p. 202.
9. Holt, L. E.: Jour. Amer. Med. Assoc., 1913, lxi., 99.
10. Boeck, C.: Medicinsk Revue, 1911, p. 500.
11. Bruusgaard, E.: vie Congrès de la Soc. Derm. du Nord Helsingfors, 1925, p. 19.
12. Darier, J.: Ann. de Derm. et de Syph., 1896, vii., 143.
13. Schaumann, J.: Ibid., 1926, vii., 193 and 279.
14. Koch, R.: Deut. Med. Woch., 1891., xcii., 101.
15. Sequeira, J. H.: Brit. Jour. Derm., 1915, xxvii., 371.
16. Gougerot, H., and Laroche, G.: Arch. de Med. exper. et d'Anat. path., 1908, v., 581.
17. Lewandowsky, F.: Arch. f. Derm. u. Syph., 1916, cxxiii., 1.
18. Jadassohn J.: Korrespond. f. Schweiz. Ärtze, 1912, xlii., 22; Berlin klin. Woch., 1918, lv., 489.
19. Guth, A.: Arch. f. Derm. u. Syph., 1913, cxviii., 856.
20. Sutter, E.: Derm. Zeit., 1917, xxiv., 65.; Arch. f. Derm. u. Syph., 1920, cxxvii., 735.
21. Bloch, B.: Korrespond. f. Schweiz. Ärtze, 1912, xlii., 3.
22. Rasch, C.: Brit. Jour. Derm., 1916. xxviii., 9.
23. Pulvermacher, L.: Derm. Zeit., 1919, xxvii., 11.
24. Jessner, M.: Arch. f. Derm. u. Syph., 1921, cxxxvi., 416.
25. Ambrosoli, G. A.: Giorn. Ital. d. mal. ven. e della pelle, 1921, iii., 233.
26. Bruusgaard, E.: Brit. Jour. Derm. and Syph., 1922, xxxiv., 150.
27. Neisser, A.: Arch. f. Derm. u. Syph., 1902, lx., 63.
28. Sabouraud, R.: Pyodermites et Eczémas, Paris, 1928, p. 199.
29. Whitfield, A.: THE LANCET, 1921, ii., 168.
30. Barber, H. W., Attwater, G. L., and Marshall, G.: Brit Jour. Derm. and Syph., 1921, xxxiii.,154.
31. Barber, and Dowling, G. B.: Proc. Roy. Soc. Med., 1926 xix., 33.
32. Schaumann, J.: Tuberculides, iiie., Congrès des Dermatologistes et Syphiligraphes, Brussels, 1926.
33. Finnerud, C. W.: Brit. Jour. Derm. and Syph., 1925 xxxvii., 67.
34. Whitfield, A.: THE LANCET, 1921, ii., 168.
35. Sutton, R.: Diseases of the Skin, St. Louis, 6th edit., 1926 p. 251.
36. Visher, J. W.: Amer. Jour. Med. Sci., 1925, clxx., 723.
37. Lendon, A. A.: Nodal Fever, London, 1905, and Brit. Med Jour., 1925, i., 651.
38. Symes, J. Odery: Erythema Nodosum, Bristol, 1928.
39. Landouzy, L. Laederick, and Richet: Press Méd., 1913 xxi., 1045.
40. Pernet, G.: Lupus érythémateux aigu d'emblée, Paris., 1908
41. Civatte, A.: Ann. de Derm. et de Syph., 1926, vii., 465.
42. Gray, A. M. H.: Brit. Jour. Derm. and Syph., 1926, xxxvii., 406.
43. Gougerot, H.: Rev. de la Tubercul., 1908, v., 345.
44. Ehrmann, S., and Reines, S.: Med. Klin., 1908, iv., 1298.
45. Bloch, B., and Fuchs, H.: Arch. f. Derm. u. Syph., 1913 cxvi., 722.
46. Cannon, A. B., and Ornstein, G. G.: Ibid., 1925, xii., 691.
47. Dyson, W.: Brit. Jour. Derm. and Syph., 1925, xxxvii., 401
48. Sibley, W. Knowsley, and Wynn, W. H.: Ibid., 1923, xxxv., 323.
49. Gibson, R.: Ibid., 1925, xxxvii., 232.
50. Galloway, J., and Macleod, J. M. H.: Ibid., 1903, xv., 81.
51. Whitfield, A.: Ibid., 1909, xxi., 1.
52. Guy, W. H.: Arch. Derm. and Syph., 1923, viii., 754.
53. Coombs, Carey, F.: Proceedings of a Conference on Rheumatic Diseases, Bath, 1928, p. 136.
54. Bloch, B.: Arch. Derm. and Syph., 1929, xix., 175.
55. Adamson, H. G.: Modern Views upon the Significance of Skin Eruptions. Goulstonian Lectures, London, 1912; and Brit. Jour. Derm. and Syph., 1924, xxxvi., 1.
56. Lewis, T.: Blood Vessels of the Human Skin and their Responses, London, 1927, p. 286.
57. Birkhaug, K. E.: Jour. Infect. Dis., 1927, xl., 549.
58. Strauss, H.: Deut. Med. Woch., 1927, liii., 737.
59. Kaiser, A. D.: Jour. Infect. Dis., 1928, xlii., 25.
60. Burhans, C. W.: Jour. Amer. Med. Assoc., 1927, lxxxix., 1299.
61. Cummins, S. Lyle: Brit. Med. Jour., 1929, i., 336.
62. Mendel, F.: Med. Klin., 1908, iv., 402.
63. Mantoux, C.: Compt. rend. Acad. des Sci., 1908, cxlvii., 335
64. Colliver, J. A.: Arch. Pædiat., 1915, xxxii., 92.
65. Pedersen, M. D.: Derm. Zeit., 1917., xxiv., 731.
66. Sutter, E.: Ibid., 1917, xxiv., 65.
67. Howitt, F. D.: Brit. Med. Jour., 1929, i., 338.
68. Brocq, L.: Cliniques Dermatologiques, Paris, 1924, p. 72
69. Burnet, E.: Ann. de l'Inst. Pasteur, 1912, xxvi., 868 Soc. de Biol., 1912. lxxiii., 384.
70. Bruusgaard, E.: Norsk Magazin. f. Leagevidenskaben Dec., 1928.
71. Gosse, A. H.: Practitioner, 1913, lxxx., 240.

FURTHER OBSERVATIONS ON THE HISTOLOGY OF CARCINOMA OF THE BREAST.

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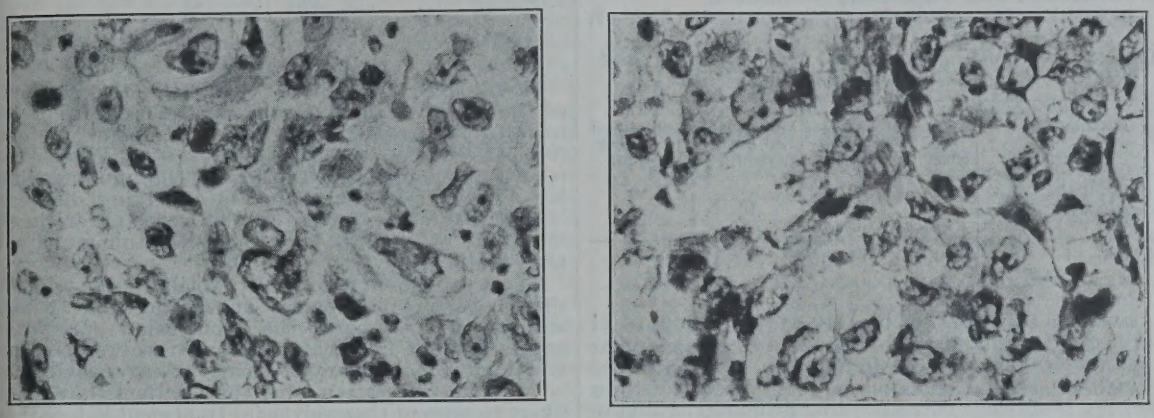
WITHIN recent years many investigations have been conducted with the object of ascertaining the relationship, if any, which exists between the varied histological pictures presented by carcinomata of similar organs and their response to treatment, either surgical or radiological. As a result, certain workers (e.g. Broders, Healy, Greenhough), have concluded that an index of malignancy based on the histological features should prove of value clinically. As a rule it has been found that attention is best directed to the actual tumour cells, neglecting or paying small attention to stromal changes.

In a previous communication [1] we brought forward evidence to show that in the case of carcinoma of the breast such a relationship between the histological appearance and the subsequent clinical course of the disease does exist; but we came to the conclusion that the histological index of malignancy should be used only as an auxiliary to other factors, and that the important point was the stage to which the disease had advanced at the time the treatment was

undertaken. In actual practice it was believed that the histological malignancy should prove of prognostic value in cases in which the disease had spread from the breast to the axillary glands, but had not yet widely infiltrated those glands—i.e., a group intermediate between the early and the advanced cases of carcinoma of the breast. In furtherance of this work, we thought it might be of interest to study the relationship between the histological appearance of the primary growth and that of its secondary deposits. The results of such an investigation are herewith recorded (A). In addition, under (B) the histology of those tumours of the breast which have given rise to metastases in the glands is compared with the appearances of those growths in which microscopical examination of the axillary glands has failed to demonstrate metastases.

FIG. 1.

A.—Primary tumour. B.—Secondary deposit in axillary gland.



The tumours are identical in appearance and malignancy. (The majority of the cases were in this category.)

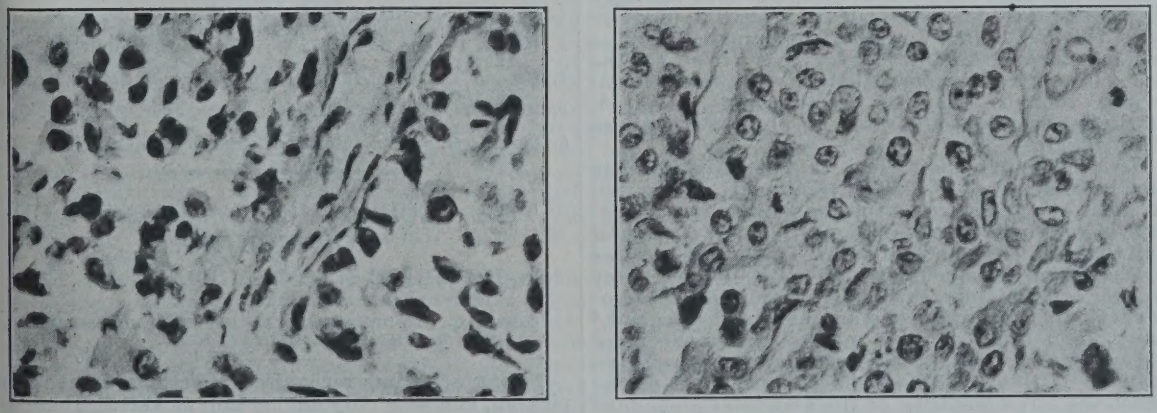
(A.) *The Relationship between the Histological Appearances of the Primary Growth and its Secondary Deposits.*

In spite of its apparent importance no detailed accounts of the comparative histology of primary carcinomata and their secondary deposits have been traced, although generalisations on the subject are not infrequent. Ewing,[2] discussing carcinomata in general, states that "in metastatic deposits preservation of structural type is often remarkable yet, as a rule, there is increased anaplasia and more rapid growth in metastatic tumours." Delbet and Mendaro,[3] on the other hand, speaking of breast carcinomata, say that the secondary deposits in lymphatic glands are often more differentiated than the primary tumours. In neither case are examples quoted, nor is any detailed analysis given.

The material examined consisted of the microscopic sections of 110 consecutive cases of carcinoma of the breast submitted to the operation of radical removal at the Middlesex Hospital, from 1926 to 1928 inclusive, in which histological examination showed metastasis in the axillary lymph nodes. The method of study of the cases was identical with that used previously, and the material was classified into three groups, Group I. representing a low and Group III a high degree of malignancy.

FIG. 2.

A.—Primary tumour (Group 3). B.—Secondary deposit (Group 2).



The secondary deposit is less malignant than the primary growth.

The criteria adopted in assessing the malignancy have already been given,[1] and briefly are those changes which indicate the degree of departure from the structure and arrangement of normal breast epithelium. The three characters on which most stress has been laid are: (1) tubule formation; (2) irregularity in size and shape of nuclei; (3) hyperchromatism. Other factors which have been noted are: (4) the amount of secretion and (5) the number of mitoses.

No attention has been paid to the presence of fibrosis, leucocytic infiltration, nor any factor not directly concerned with the appearance of the epithelial cells.

In order to obtain an opinion as unbiased as possible the sections of all the primary tumours were first examined, and then independently the sections of the secondary deposits. Each primary growth was then compared with its metastases, and any differences noted on the independent examination were discussed and, if necessary, confirmed.

The results of the analysis are summarised in Table I.

TABLE I.—*Showing Numbers of Cases with and without Changes in Malignancy of Metastases.*

Histological group of primary.	No. of cases.	Metastases in same group.	Metastases in lower group.	Metastases in higher group.
1. Low malignancy	24	24	—	0
2. Moderate ,,	39	28	10	1
3. High ,,	47	39	8	—
Total	110	91	18	1

It will be seen that, of the 110 cases studied, in 91 the breast and glands were classified as being similar in histological type and malignancy; of the remaining 19, in 18 the secondary deposits were placed in a lower category than their corresponding primaries, whilst in only one instance was it found that the glandular deposits had been placed in a higher category. As a result of these findings one may say that in the large majority of cases of carcinoma of the breast (approximately 83 per cent. in this series) the histological malignancy of the secondary deposits in the axillary glands is almost identical with that of the primary tumour; in an appreciable minority (16 per cent.) the secondary deposits have a less malignant appearance, whilst only rarely (one case) does the growth in the glands appear more malignant than the primary tumour.

Discussion.—With regard to the practical application of this investigation two points of importance suggest themselves. In the first place it is seen that in assessing the malignancy of carcinoma by histological means attention should be directed to examination of the primary growth. Furthermore, it is obvious that it would be useless to look for signs of prognostic value in the primary growth if, in many cases, the metastases were of a higher malignancy, as each secondary growth would serve as a focus for the spread of carcinoma more malignant than the original primary tumour. But the investigation has shown that in the breast, at any rate, this occurs so rarely as to be negligible.

The other point upon which this investigation has some bearing is that of radium treatment. It is well recognised that, in many situations, the radium treatment of lymphatic secondary deposits is less successful than that of the primary growth. The question arises whether this is due solely to difficulties of access or whether other factors, such as alteration in the radiosensitivity of the growth cells, are concerned. Regaud,[4] Healy,[5] and other workers maintain that the more differentiated a tumour the less is its response to radium. If this hypothesis be correct, since in the breast the large majority of the glandular secondary deposits have a similar appearance to that of the primary growth, they should react in the same way to radium; but in the occasional case in which the growth in the gland is more differentiated this secondary growth might prove more refractory to radium.

(*B.*) *Histological Malignancy and Metastasis.*

During the period in which the above 110 cases of carcinoma of the breast with axillary secondary deposits were encountered there were 53 cases which showed no secondary deposits. These 53 cases constitute 32·5 per cent. of the total number which underwent the radical operation, a figure which agrees closely with that of 30 per cent. quoted by Barling for the cases in the Birmingham Hospitals.[6] They also were examined and classified in the manner noted above, and the reults are given in Table II.

TABLE II.—*Histological Malignancy and Metastasis.*

Histological group of primary.	Total No. of cases.	No. with metastases (from Table I.).	No. without metastases.
1. Low malignancy ..	54	24	30
2. Moderate ,, ..	57	39	18
3. Marked ,, ..	52	47	5
Total	163	110	53

It will be seen that more than half (56·6 per cent.) of the cases which have not metastasised are of low histological malignancy, whilst only about one-tenth (9·4 per cent.) are in the high category. When these results are compared with those of the tumours which have shown secondary deposits a striking difference is noted, as of the latter only 22 per cent. are in the low grade, whereas 43 per cent. of the tumours are of high malignancy.

These results, in addition to verifying the relationship between histological appearance and clinical malignancy, support the conclusion previously expressed that in a carcinoma of the breast of low histological malignancy the early or favourable stage is of longer duration and that patients are more likely to present themselves for treatment before there has been much spread of the disease.

Summary.

(1) 110 carcinomata of the breast with their secondary deposits in the axillary glands, and 53 cases without secondary deposits have been examined from the point of view of the histological appearances of malignancy. (2) In the large majority of instances (83 per cent.) the secondary deposits in the lymphatic glands are similar in appearance and malignancy to the primary growth; in an appreciable minority (16 per cent.) the malignancy of the glandular metastases is lowered, but only in one case is the malignancy raised. (3) The series of cases in which secondary deposits have not been found in the axillary glands shows a relatively much greater number of tumours of low histological malignancy than does the series with such deposits.

References.

1. Patey, D. H., and Scarff, R. W.: THE LANCET, 1928, i., 801.
2. Ewing, J.: Neoplastic Diseases, Philadelphia, 1928, p. 87.
3. Delbet, P., and Mendaro, A.: Les Cancers du Sein, Paris, 1927, p. 58.
4. Regaud, C.: Rep. Internat. Conference on Cancer, London, 1928, p. 64.
5. Healy, W. P., and Cutler, M.: Amer. Jour. Obst. and Gyn., 1928, xvi., 15.
6. Barling, G.: Rep. Internat. Conference on Cancer, London, 1928, p. 170.

THE OCCUPATIONAL DISEASES OF HOP-PICKING.

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THERE are three recognised affections due to hop-picking, and seen only among hop pickers. These are known as "hop rash," "hop eye" and "hop gout," and are familiar to those who have worked in and among hop gardens. The literature concerning them is, however, scanty.

Hop Rash.

The first mention of hop rash was made by Badham[1] in 1834, who contracted a dermatitis as the result of putting his own chapped hands into a "bin" of hops. He also records the case of a girl of 14 years of age who, while suffering from chilblains, plunged her hands into a "bin" of hops to warm them and then developed a rash similar to the one he had suffered from himself. O'Donovan,[2] in 1924, again drew attention to the condition, and recorded two cases which he saw at the London Hospital. He points out that they follow

the general type reaction as described by Sequeira in cases of dermatitis caused by plants. He states that "females only, so far, have been affected from the ages of 12 up to 67, and always in the month of September." Lewith[3] notes the occurrence of three cases, all females.

In a letter to THE LANCET in October, 1924, after reading O'Donovan's article, Streich[4] describes a case of hop rash in a woman of 40 who, in addition to the rash on her hands and face, which was typical in appearance, also developed a purpuric rash on her legs. A further reference to the condition was made about the same time by Galbraith,[5] who says that "Dr. Ebden, in charge of the Hop Pickers' Hospital and Dispensaries at Marden, noted 58 cases of hop rash." Galbraith also states his belief that this hop rash, together with the conjunctivitis and synovitis noted, is produced by some irritant from the hop plant. In support of this belief he says that "owing to the remarkable absence of vermin from the hops in the present year (i.e. 1924), no washes have been used." This discountenances any theory there may be that the affections under consideration are due to the chemical washes used on the plants. This is further supported by the fact that no regular garden employee applying washes to the hops during their period of growth has been known to suffer from the rash, conjunctivitis, or gout.

The next reference to the subject is found in a brief note in the Annual Report for Kent for 1926, as reported in THE LANCET,[6] in which of 25,000 pickers it is said that 237 suffered from hop rash, 95 from hop eye, and 87 from hop gout. It is thus evident that the affections are fairly common among the pickers.

My own attention was first drawn to the subject when acting as medical officer to the Hop Pickers' Hospital and Dispensaries at Marden in 1927, when a number of cases were seen and treated. In 1928, when acting in the same capacity, I made careful notes of all cases seen throughout the hop-picking season of August and September, and out of a total of 1172 cases of all kinds 52 were of hop dermatitis. Of these, 4 were men, 39 were women, and 9 were children of both sexes under 14 years of age. The incidence of cases among males is of interest in face of the fact that all recorded cases have hitherto been females.

The 52 cases mentioned made a total of 81 attendances at the hospital for treatment, thus indicating the short duration of the disease. It appears to recur in the same individual year after year. One or two adults remembered suffering from it as children and had thereby been deterred from hopping, but they had ventured again thinking that they might have outgrown their susceptibility. This was not so. One boy of 12 years of age had suffered from it severely on each of his two visits to the hop gardens, and was not anxious to return the following year, in spite of the alluring prospect camp life in the country must offer to the East-end child.

The onset of the disease is marked by a papular erythema occurring on exposed surfaces; hands, arms, face, in one or all of these situations. The accompanying irritation is intense, and it is usually this which drives the patient to seek medical advice. Concomitant with this is usually some general constitutional disturbance which may be severe. In the worst cases the patient complains of headache and irresistible drowsiness. One case which came to the hospital almost fell asleep as she described her symptoms, and it was only by making a considerable effort that she was able to concentrate sufficiently on her tale to make herself clear. In this case headache was a prominent feature. The face and hands were covered with a dense papular erythema, and there was considerable œdema of the parts, so much so that the woman could scarcely see out of her eyes, and was unable to clench her fists.

The papular stage may rapidly become vesicular and then pustular, the pustules varying in size from about one-tenth of an inch to half an inch in diameter. Associated with the dermatitis are invariably a number of small scratches from the hop bines. Pickers' hands are always deeply stained a dark green colour, and have the characteristic smell of hops about them. The colour is no doubt due to a conglomeration of hop washes, hop juices, and hop pollen. The presence of innumerable scratches, together with an inevitable inoculation of them with hop juices and pollen, suggests some kind of protein sensitisation.

Hop Eye.

Hop eye has received much less attention than hop rash. It was first discussed by Adams,[7] who made an exhaustive examination of the hop plant, and came to the conclusion that hop eye is due to a mechanical irritation of the eye by the spine-shaped hairs found on the top bracts, leaves, and bines. The condition is also recognised by Prosser White,[3] and is mentioned by Galbraith,[5] and the Kent Annual Report, 1926.[6]

At the Marden Hop Pickers' Hospital in the 1928 season, 14 cases of hop eye occurred among the total of 1172 patients treated. Of these, 11 were women and 3 were children. No cases were noted among men. The condition in a previously healthy eye is a conjunctivitis. There is considerable lacrymation, and usually there is œdema of the eyelids associated with it. Hop eye comes on rapidly after the eye or eyes have been rubbed with fingers dirty from hop-picking. The patient comes complaining of pain in the eye, smarting in character, which rapidly becomes worse. On examination the conjunctiva is uniformly reddened and lacrymation is marked. The amount of accompanying œdema of the lids varies considerably. In one case a woman came running in from the hop garden with a "swollen eye." She was positive that the swelling came up within a few moments of having rubbed the eye with her fingers. Her fingers were covered with the usual dark green stain from the hops. The conjunctiva of the eye was perfectly clear and there was no lacrymation. The lids were both swollen so much that the patient was unable to open them herself.

As in hop dermatitis, the association between a receptive body surface and a possible source of protein irritation is striking. The similarity between these conditions and those produced experimentally on a much smaller scale by the cutaneous and ophthalmic reactions used in the estimation of individual susceptibility to such proteins as those, for example, which are known to produce hay-fever, is arresting and merits further investigation.

Hop Gout.

The only references to hop gout are made by Prosser White[9] and Galbraith.[5] It is recognised by hop pickers and growers as a condition peculiar to the hop-picking season. Like the dermatitis and conjunctivitis it is never seen at other times of the year among workers in the hop gardens.

At the Marden Hospital in the 1928 season, of the 1172 cases seen only 17 were treated for hop gout. Although 50 per cent. of all cases were children, not one of them was found to be suffering from hop gout. Women appeared to be more frequently affected than men, for of the above 17 cases 11 were women varying from 20 to 70 years of age, and the remaining 6 were men of from 29 to 58 years of age. It should be pointed out that in all three of these conditions the prevalence among women is probably due in part, if not entirely, to the fact that the number of women employed is very much greater than the number of men. The patient suffering from hop gout comes complaining of pain, limitation of movement, and swelling of fairly rapid onset. It may occur in the fingers, hand, wrist, or forearm, and is unilateral, The swelling is red and tense, and on palpation a typical fine crepitation is felt like the crunching of crisp snow. In most cases the condition runs as short a course as the allied rash and conjunctivitis.

The following are notes of a typical case:—

A man of 29 years came complaining that he could not use the first and second fingers of his right hand, and of a painful swelling on the back of the hand. He had started work

on the previous day feeling quite fit as usual. In the afternoon he had noticed that the first finger was "getting tired." It then began to feel numb, so that he had to stop picking and rub it till sensation was restored. After the tea interval the back of the hand had begun to ache, but no swelling was noticeable. He rubbed some liniment into the hand that night and slept soundly. The next morning he found, while dressing, that he could not pick things up easily, and kept dropping them. The back of the hand then appeared to be red and a little swollen. He tried to work in the hop garden that morning, but found that he could only use the hand for short spells at a time. After half an hour's picking a quarter of an hour's rest was necessary to restore the feeling in the hand.

On examination a red tense swelling was seen on the dorsum of the right hand. On palpation it appeared to be very tender. No fluctuation was felt and there was no pitting on pressure. On passive movement of the first finger fine crepitations could readily be felt in the swelling especially along the line of the first metacarpal bone, and similarly on passive movement of the second finger crepitations were felt along the proximal third of the corresponding metacarpal bone. None was felt on movement of the third and fourth fingers. Measurements were made of the swollen parts and comparison made with the sound hand. The patient was not subject to any digestive disturbances, and no trace of a gouty diathesis was apparent.

Whether one is justified in associating this synovitis with the dermatitis and conjunctivitis described remains to be seen. The ætiology of all three of them is as yet obscure, and it is to be proved whether the origin of one or all of them can justly be attributed to a protein sensitisation.

References.

1. Badham, J.: Exanthema and Narcotism from the External Application of Hops, Lond. Med. Gazette, Oct. 25th, 1834.
2. O'Donovan, W. J.: THE LANCET, 1924, ii., 597.
3. Lewith, R.: Arch. f. Derm. u. Syph., 1928, cliv., 239.
4. Streich, C. J.: THE LANCET, 1924, ii., 727.
5. Galbraith, S. N.: Ibid., p. 885.
6. See THE LANCET, 1927, i., 582.
7. Adams, P. T.: Brit. Med. Jour., 1893, i., 1000.
8. White, R. Prosser: Occupational Affections of the Skin, 3rd ed., p. 436, H. K. Lewis, 1928.
9. Ibid.

Clinical and Laboratory Notes.

SPONTANEOUS REDUCTION IN VOLVULUS OF THE BOWEL.

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IT is generally believed that volvulus is sometimes reduced spontaneously, but direct evidence is difficult to obtain, for once reduction has occurred there is usually no occasion for either operation or post-mortem examination. The following cases are of interest, in that they provide evidence of reduction having occurred.

CASE 1.—A Mohammedan agricultural labourer, aged 50, was admitted to the King George V. Hospital, Lucknow, with a much distended abdomen, occasional vomiting, and periodic attacks of griping pain. He said that in the last four years he had had three similar attacks which had passed off after a day or two. This attack was more severe, and had lasted four days, during which he had passed neither fæces nor flatus. Enemata produced no result, and at operation a volvulus of the sigmoid was found. The affected loop was enormously distended, and its walls were hypertrophied. It was easily untwisted and at once emptied into the rectum. It was then noted that besides a few soft recent adhesions there were old firm adhesions at the pedicle of the volvulus binding the two ends of the loop together, and a patch of old scarring on the bowel, evidently the result of a previous attack. The ends of the loop were separated so far as possible, and fixed, in the hope of preventing a recurrence. The patient recovered.

The next two cases concern the small intestine, and it is necessary here to refer to the frequency of volvulus of the small intestine in India. I have met with it in 6 out of 25 operations, and in 2 out of 4 postmortems.

CASE 2.—A Hindu male, aged about 40, was admitted to the Thomason Hospital, Agra, on the third day of obstruction. He gave a history of a similar attack about two years previously. The general condition was grave.

At operation the cæcum and lower ileum were empty, and on tracing the empty bowel upwards it was found that a few inches above the ileocæcal valve it was firmly adherent to the root of the mesentery. Above this point were some feet of normal but empty bowel. The bowel was then again adherent to the root of the mesentery; from this point upwards it was distended.

The arrangement of the bowel and mesentery was exactly like that of a volvulus; the mesentery was gathered up like a pedicle between the points of adhesion to the bowel. But the intervening loop was empty instead of distended, as in volvulus, no twist was really present, and further examination showed that the obstruction was due to a stricture, the result of extensive scarring of the bowel. Obviously there had once been a volvulus which had undergone spontaneous reduction after causing grave damage to the intestine.

The third case is an example of a type very common in India, in which what appears to be grave obstruction is relieved by a succession of enemata, leaving the surgeon wondering what was the nature of the obstruction. But this patient died soon after the relief of the obstruction, and furnished a most interesting post-mortem.

CASE 3.—A Nepalese road labourer, aged about 30, was admitted to the Crossthwaite Hospital, Nainital, with distension, vomiting, and pain. The onset, 12 hours previously, had been sudden, and the patient showed some degree of collapse. He had already taken a purgative. He refused operation, and two enemata failed to relieve him. An hour later, after a third enema, he passed a copious watery motion, but became so collapsed that an intravenous infusion was called for. Twenty minutes later a further action occurred and all distension disappeared, but he died a few minutes later.

A post-mortem examination was made within two hours. The only abnormalities found were the following. There were subserous hæmorrhages in the ileum, most marked at the antimesenteric border, and increasing in intensity as the bowel was traced downwards to a point about 4 inches from the ileocæcal valve, where they ceased abruptly. There was also a contusion on the left face of the mesentery at this level, in the form of an oblique streak near its root. There was no thrombosis in the mesenteric vessels. The lower limit of the subperitoneal hæmorrhages corresponded with the usual lower limit of a volvulus of the small intestine, and I have noted identical bruising in one post-mortem and in one operation in cases of volvulus, the bruise being simply the impress of the tense lower end of the loop.

It is impossible to explain these findings, except on the basis of a volvulus which had undergone spontaneous reduction.

EPIDEMIC (LETHARGIC) ENCEPHALITIS IN A VERY YOUNG INFANT.

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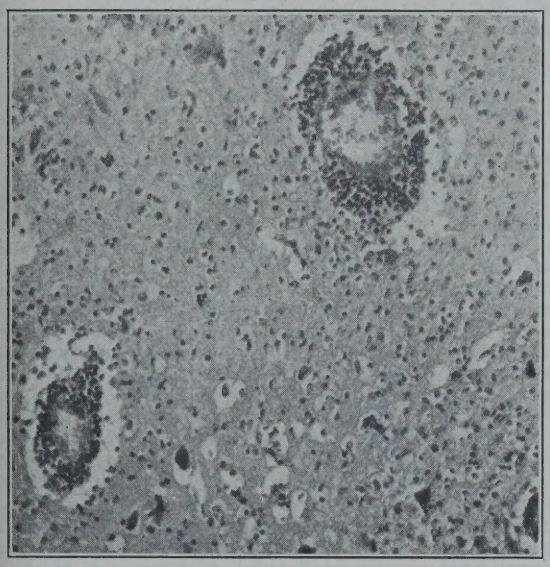
CASES of encephalitis lethargica in very young infants are of rare occurrence, although instances of infected mothers passing on the disease to their offspring have been recorded. The youngest of this type contracted the disease when two weeks old, as described by W. Harris[1] and subsequently further discussed in the Ministry of Health report.[2] Sporadic cases of the disease in early infancy have been described. Neal[3] in a collection of 274 instances of the disease finding four under the age of three months. Happ and Mason[4] recorded a case of encephalitis lethargica in a black baby at the age of five weeks, and Findlay and Shiskin[5] described a non-fatal case of an infant which became drowsy at three weeks of age, with a left internal squint. The following case is put on record because of its exceptional nature, in that symptoms appeared at the end of the second week of life, although there is no evidence that the mother was the source of infection.

A. B. was the first child, born at full term of healthy parents. The mother was in excellent health throughout pregnancy, and neither then nor at any other time had

suffered from any symptoms which could be attributed to encephalitis lethargica. The labour was normal and light chloroform anæsthesia was induced during the last hour. The baby was not at all cyanosed at birth and for the first 14 days of life remained perfectly healthy. At the age of one week circumcision was performed under light ether anæsthesia, and the subsequent progress was excellent for a week. At no time was the child in contact with any patient suffering from any of the symptoms of encephalitis lethargica. Vaccination was not performed.

At the age of 14 days it was noticed that the child was irritable. Then drowsiness set in and it became increasingly difficult to rouse the child, who was admitted to the Hospital for Sick Children at the age of one month. The bowels had been acting normally, there had been no vomiting, no head retraction, and no convulsions.

On admission the baby lay in a very drowsy state, from which it could not be roused even for feeding. No cry could be elicited by any form of stimulation. The left side of the face was paralysed, and there was some slight rigidity of the limbs. The knee-jerks were active and the plantar responses flexor. The pupils were contracted and did not react to light. Ophthalmoscopic examination revealed normal discs. The fontanelle was depressed, the temperature was normal, and the pulse-rate was 130 per minute. No abnormalities could be found in the other organs or systems. The urine was normal and the blood-urea was 42 mg. per 100 c.cm. A superficial nævus about two inches in diameter was present behind the left ear. The respirations ceased on several occasions before death, but artificial respiration was effective in restoring the normal respiratory rhythm until two days after admission, when death occurred. The cerebro-spinal fluid was not examined.



Section of optic thalamus. (× 100.)

The *post-mortem examination*, 20 hours after death, showed no naked eye abnormalities of any organ. The brain was more congested than normal, but there was no special localisation of this congestion in any part of the brain. No sign of any nævoid condition of the vessels of the meninges or brain was present. Portions of the cerebral cortex and basal ganglia were submitted to histological examination. In the optic thalamus definite evidence of the presence of encephalitis of the "lethargica" type was obtained (see figure). The perivascular lymphatic spaces were full of small round cells giving the classical appearance of "cuffing," while there is also a more diffuse but less well-marked infiltration of the brain-tissue between the blood-vessels. Other regions of the brain examined appeared normal.

I am indebted to Dr. Hugh Thursfield for permission to publish this case, and to Prof. J. McIntosh and Dr. J. G. Greenfield for kindly examining the histological sections of the brain.

References.

1. Harris, W.: THE LANCET, 1918, i. 568.
2. Reports on Public Health and Medical Subjects, No. 11, 1922. Ministry of Health, p. 33.
3. Neal, J. B.: Jour. Amer. Med. Assoc., 1921, lxxvii., 121.
4. Happ, W. M., and Mason, U. R.: Bull. Johns Hopkins Hosp., 1921., xxxii., 137.
5. Findlay, L., and Shiskin, C.: Glasg. Med. Jour., 1921, xcv., 18

CONTINUOUS ARTIFICIAL RESPIRATION,

WITH MAINTENANCE OF THE CIRCULATION FOR TWELVE HOURS AFTER APPARENT DEATH.

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Many cases have been reported in which patients who have collapsed during, or shortly after, operation and apparently died, have been resuscitated, and their life maintained for varying periods; yet I consider the following case exceptional enough to be reported.

History of the Case.

A married man, aged 51 years, a railway clerk, was admitted to the David Lewis Northern Hospital, Liverpool (case No. 1894/29), suffering from trigeminal neuralgia. Seven years previously he had had a right lower molar tooth removed on account of a root abscess. Shortly after the extraction the neuralgia started, and at first involved the whole of the right side of the face. Three years later a sequestrum was removed from the site of the previous trouble in the lower jaw, and after this the neuralgia was confined to the right inferior maxillary nerve. The nerve had been injected with alcohol on three occasions with definite, but only temporary, relief. The relief from pain after the third injection lasted only a few weeks.

As life, especially in cold weather, had become unbearable owing to the frequency and severity of the attacks of neuralgia, it was decided to cut the sensory root of the right Gasserian ganglion. On July 13th, 1929, under rectal ether anæsthesia, the ganglion was approached through a subtemporal trephine opening one inch in diameter, and its two maxillary divisions and its sensory root were clearly defined. While the ganglion was being shown to the students the overlying brain suddenly bulged, forcing the brain retractor down on to the base of the skull. It was immediately obvious that an intradural or cerebral hæmorrhage had occurred, and all thought of cutting the sensory root of the nerve was abandoned, and instead, a hook-shaped knife was quickly passed round the inferior maxillary nerve between the ganglion and the foramen ovale, and in this way the nerve was cut.

The dura was now bulging through the trephine hole, and all cerebral pulsation had stopped. The opening in the skull was enlarged with bone forceps and the dura was opened. No blood escaped, but the brain was pushed out and lacerated on the edge of the skull opening, so great was the intracranial pressure. The opening in the skull was still further enlarged, and as some pulsation could now be seen, and as the general condition of the patient did not warrant further interference, the wound was quickly sewn up. The patient returned to the ward at 12.40 P.M., and at that time he was breathing regularly, and the pulse did not give any cause for alarm.

At 1.0 P.M., shortly after the rectum had been washed out to remove the ether, the patient collapsed and stopped breathing. The house surgeon was called to the ward, and found the heart beating very feebly; he started artificial respiration, but at 1.40 as there was no sign of active respiration restarting, and as the heart beat could no longer be felt or auscultated, he ceased his efforts and came to report that the patient had "died."

I saw the patient about 1.50 P.M.; he was then apparently dead. The eyes were dilated and fixed, all the muscles flaccid and the reflexes absent, respiration had stopped and there was no indication that the heart was beating. We decided, however, to make a last effort, and restarted artificial respiration. After a few minutes the pulse began to return and steadily increased in volume, but there was no other sign of life. By 2.15 the heart was beating rapidly (140), but so strongly that there was marked intercostal and epigastric pulsation. All attempts to restart active respiration were in vain, and by 3.30 P.M. the heart had again become weak and the pulse impalpable.

An intracardiac injection of 1 c.cm. of 1-1000 adrenalin was given and within a few minutes the heart was once more beating strongly. After about twenty minutes the force of the heart beat once more began to fade, but a second injection of adrenalin again restored its force, so that, even through the bed-clothes, it was possible to see the præcordial and epigastric pulsation.

And so it continued, the pulsation of the heart the only sign of life. Intracardiac injections of adrenalin were given every 15–20 minutes; after each injection the heart beat strongly for ten or more minutes, and then gradually faded away, only to come back promptly after another injection. At 6.0 P.M. the wound was examined; little or no blood had drained out, but the whole area bulged markedly, so the

skin stiches were removed. At this moment an injection of adrenalin was given, and immediately there was a burst of hæmorrhage from some of the skin vessels, and artery forceps had to be applied and the vessels ligated. Slight pulsation of the brain was noted. The dressings were replaced.

At 8.0 P.M. the pulse-rate was 140, and in the brachial artery the systolic pressure was 125 and the diastolic pressure 75 mm. of Hg. At 8.45, immediately after the 18th injection of adrenalin, the pulse-rate was 148 and the systolic and diastolic pressures 135 and 80. Though the effect of the injections was still phenomenal it was now noted that the pulse-rate was steadily increasing, and the effect of each injection was not as lasting as the earlier ones had been. Yet even then, if, when the patient was quite pulseless, an intracardiac injection of 1 c.cm. of adrenalin was given, within a minute the heart would be beating so strongly that pulsation could be easily seen in the epigastric region and in the vessels in the neck.

Artificial respiration and the injections of adrenalin were continued until midnight when the 27th and last injection was given. The heart continued to beat feebly until 1.30 A.M. Artificial respiration was then stopped. Except for the ten minutes between 1.40 and 1.50 P.M., artificial respiration was maintained continuously for twelve and a half hours, during which time the patient showed no sign of life other than the pulsation of the heart.

Post-mortem Examination.

We were unable to obtain permission for a full post-mortem, but we examined the lungs, heart, and brain.

The *lungs* were normal. The *heart* was also normal, except for an area of ecchymosis extending from the surface almost through into the heart cavity. This area was about the size of a sixpence, and was situated on the anterior wall of the right ventricle, and had been produced by the numerous intracardiac injections.

Head.—Except for the opening made to decompress the brain there was no opening or puncture in the dura. No hæmorrhage was found on the right side of the brain. There was considerable diffuse subdural hæmorrhage on the left side of the cerebrum and on the front of the pons and medulla. The left lateral ventricle was filled with blood, but there was no hæmorrhage in the brain substance.

Very careful examination of the operation field showed that at no place had the dura been opened, nor was there any hæmorrhage either within or without the dura. The inferior maxillary division of the trigeminal nerve had been cut through close to its origin from the Gasserian ganglion, but otherwise the nerve was intact. There was no bony covering to the carotid canal, but neither the carotid artery nor the superior longitudinal sinus was injured. The cavernous sinus was intact. The right superior cerebellar artery appeared to be severed, but there was no clue as to how this had happened, and I am of the opinion that it was injured in removing the brain.

It is very unsatisfactory that no explanation was found to account for the sudden, dramatic, and fatal hæmorrhage. Exactly the same technique was used in this case as in all our previous cases of section of the sensory root of the Gasserian ganglion, none of which had given rise to any trouble or anxiety.

Lieut.-Colonel C. T. Samman, J.P., R.A.M.C., was recently re-elected Master of the Society of Apothecaries of London for the ensuing year.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.—An all-day course in diseases of the chest will be held at the Brompton Hospital from Sept. 9th to 14th. From Sept. 9th to 22nd, under the direction of Dr. Eric Pritchard, a course will be given at the Infants Hospital designed for those engaged in infant welfare work. A course of lecture-demonstrations in psychological medicine will be undertaken by Dr. Porter Phillips and members of his staff at the Bethlem Hospital, on Tuesday and Saturday mornings at 11 A.M., from Sept. 10th to Oct. 5th. An intensive course of medicine, surgery, and the specialties (for men only) will be held at the Westminster Hospital from Sept. 16th to 28th, daily, from 10.30 A.M. to 5.30 P.M. The Prince of Wales's General Hospital, in conjunction with the North Middlesex Hospital, Tottenham, will give a course in gastro-enterology from Sept. 30th to Oct. 4th. Another evening course for the first M.R.C.P. will be held from Oct. 15th to Dec. 6th, on Tuesday and Friday evenings, at 8.30 P.M. in the lecture hall of the Medical Society of London. Full particulars of the above and other courses may be had from the Secretary of the Fellowship at 1, Wimpole-street, London, W.1.

BRITISH MEDICAL ASSOCIATION.

ANNUAL MEETING IN MANCHESTER.

(*Continued from p. 479.*)

SECTION OF MEDICINE.

PATHOGENESIS AND TREATMENT OF ASTHMA.

Dr. A. F. HURST (New Lodge Clinic) remarked that this was the sixth occasion on which asthma had come up for discussion at an annual meeting, and while he doubted whether any real advance in knowledge had been made, yet he believed the disease was better understood now than heretofore. An appreciation of the variations, within the limits of the normal, of the chemical constituents of the body fluids afforded a basis upon which inherited constitutional tendencies might be explained. The pathogenesis of asthma lay in slight deviations from average blood chemistry whereby vagal overaction was favoured as against the opposing sympathetic effects. Thus arose muscular bronchial spasm and mucous secretion producing the classical changes. Suprarenal exhaustion, he thought, played no insignificant part, as shown by the increased liability to asthma as the result of fatigue, which partially explained week-end, menstrual, and pre-holiday attacks. The part played by adrenalin was demonstrated by the low blood-sugar content, the low blood pressure, and the effect of adrenalin treatment. The hypersensitiveness made familiar by the cutaneous reactions had led to little result except for the help given by proteins in children and pollens at all ages. The nose was important from the point of view of restricted air inlet; a distended stomach or rectum might be the source of an attack. The psychological factor of expectation was potent.

Of the many forms of treatment only two approached a cure—namely: (1) Careful dietary as applied more particularly by Dr. Adam to children, and (2) residence in the Alps at a height of 4000 ft. or more. The effect of the latter was due more to atmospheric rarefaction than to freedom from dust and allergens. Nasal hygiene involved three factors: (*a*) Removal of sepsis from the sinuses; (*b*) securing a free airway; (*c*) destroying the asthma-reflex area. Biochemistry seemed to offer some prospect of cure, but this aspect had not yet been fully developed. A cheery optimism did much to help the psychological factor in many patients; reflex exciting causes, especially from stomach and rectum, always needed careful attention. The treatment of the paroxysm remained, and for this adrenalin was a specific. The principle of giving the patient instructions and a hypodermic syringe was maintained and the method of continuous adrenalin administration in status asthmaticus was described. Ephedrine had proved more useful in mild hay-fevers than in real asthma.

Dr. JAMES ADAM (Glasgow) reported his experience in the treatment of 1100 cases of asthma over a period of 30 years. He believed that their origin was: (1) toxic, (2) dependent to a large extent on nasal conditions. The toxic effect was due to combined absorption of nitrogenous poisons from the gut and to error in nitrogenous metabolism. Excessive carbohydrates in the diet were often the determinant. Over-feeding and under-exercise were the chief factors in week-end attacks. The periodicity of nocturnal, weekly, and menstrual attacks all indicated a metabolic origin. The eczema and urticaria commonly associated with asthma were due to the same cause and amenable to the same treatment. A large number of cases occurring before the sixteenth year could be cured if mouth-breathing was corrected. Oriel's work was referred to as supporting the theory of nitrogenous metabolic errors. The disappearance of eosinophilia along with the asthma in acute pyrexias was due to increased adrenal activity, which was also the basis of success in the cold bath or cold douche treatment. The frequency of a family history in asthma was attributed by the speaker to identity of environment rather than to inheritance of defect.

Prof. R. J. S. McDOWALL (London) showed how asthma could be induced by: (1) Local irritation, as by inhaling irritant gases; (2) chemical stimulation, as by injecting bodies of the histamine group; (3) nervous stimulation, as shown by Brodie and Dixon, and reflex from stimulation of the nose; (4) psychic stimuli via the vagus, on the same basis as salivation at the prospect of food. The part played by the vagus in asthma was further indicated by the associated vagal phenomena of increased bronchial secretion and occasional colitis. Week-end and digestion asthma, the low blood pressure, slow pulse, low blood-sugar curve, and eosinophilia were all, possibly or probably, vagal in origin. The two asthma camps, championing nasal defects or allergy, were both concerned with vagal activity, and he reported some recent experiments of his own, which showed that a foreign protein (peptone) injected into the circulation enormously enhanced the capacity of pilocarpine to stimulate the vagus. Hess had for years stated that asthmatics were abnormally sensitive to pilocarpine, and it was known that foreign proteins increased the amino-acid content of the blood as well as causing a temporary constriction of the bronchioles. In this way the widely varying causes and cures of asthma fitted into a more or less intelligible physiological picture.

Dr. G. H. ORIEL made the following points: Asthmatics do not all belong to one type. In asthma associated with eczema, migraine, and urticaria the van den Bergh reaction is often positive, the amino-acid is high, urates are deposited in the urine, and the blood-sugar may be low. In uncomplicated asthma the van den Bergh reaction is usually negative; the amino-acid may be high, but the blood-sugar and pressure are low, pointing to under-action of the sympathetic. A complex nitrogenous substance may be extracted from the urine during paroxysms, and this gives positive skin reactions with the patient from whom it is extracted. This substance is probably specific. In the first biochemical type treatment should be directed to the gut and liver; Adam's detoxicating treatment has proved beneficial, especially with the addition of glucose to the diet, as suggested by Osman, along with spirits of ammonia in one drachm doses, especially in children. In the second type treatment, in addition to attacking the diathesis, should be directed to stimulating the sympathetic by thyroid.

In the ensuing discussion Dr. WATSON-WILLIAMS reiterated his belief that asthma arises from a nasal reflex, while Dr. F. T. HARRINGTON emphasised the factor of nasal sepsis and the need for general detoxication, while training in diaphragmatic breathing was important. Dr. WHARRY was also a believer in nasal sepsis as a cause, but thought some method of reducing the general sensitivity of the nervous system was requisite in many cases. Dr. CAMPS recorded his experience of the inhalation of adrenalin vaporised by an oxygen stream, and claimed this as a simple and safe method which patients could easily manage for themselves.

SECTION OF SURGERY.

PAPILLOMA OF THE BLADDER.

Mr. J. B. MACALPINE (Manchester), who opened the discussion, defined a papilloma as a tumour made up of hypertrophied papillæ. Two problems invited brief preliminary discussion: (1) Do all papillomata, if left to themselves, eventually undergo malignant transformation? Many surgeons, he said, regarded all papillomata of the bladder as premalignant tumours, an attitude which produced the necessary solicitude in their treatment. (2) How shall the nature of the growth be decided? Pathological diagnosis was extremely uncertain; in the experience of many surgeons recurrence might follow the removal of tumours regarded as simple, and vice versa. Mr. Macalpine said he had come to rely solely on cystoscopic data for his diagnosis of these growths; those he judged to be simple he treated with perurethral diathermy, and those which he suspected of being carcinomatous by open operation. The longer and more delicate the villi the more benign the growth. When surface necrosis appeared malignancy was indicated. In the less benign varieties the layers of epithelium were more numerous and the tumour coarser and paler. The appearance of the pedicle was important; a thin flexible and long pedicle occurred with benign papilloma; a stiff, stumpy one indicated malignancy. The type of papilloma that was sessile over a wide area had a very unfavourable outlook. If such had been treated by diathermy some inflammatory swelling might remain closely resembling true neoplastic infiltration; regarding diagnosis, repeated cystoscopy was the only way of excluding this "pseudo-carcinoma." In about one-third of all patients papillomata were multiple, with a tendency to return, and the prognosis after operation was not so good.

In deciding on treatment perurethral diathermy was unanimously agreed to be most suitable for simple papillomata and open operation for malignant growths. When there was doubt as to the nature of the tumour, and diathermy was not plainly succeeding, open operation should be undertaken without delay. In some patients cystoscopy was impossible owing to the extent of the growth and the accompanying cystitis or hæmorrhage. In these cases valuable information might be obtained by filling the bladder with a radiographically opaque solution, when X ray examination might demonstrate the outline of any growth present. In this series six cases occurred in workers in aniline dye, which was almost certainly an exciting cause. Prior to the onset of the neoplasm in these workers there had been a premonitory period in which the patient suffered from symptoms of cystitis with occasional hæmaturia. Dr. T. H. Wignall had drawn attention to the long period of contact necessary, 20 to 30 years being the average.

Mr. Macalpine outlined his method of treatment, stating that bipolar diathermy was generally used in this country for small benign papillomata. At the end of about two to three weeks benign papillomata should be definitely smaller and have separated, their appearance simulating granulation tissue. If slough still adhered to the growth malignancy must be suspected. If the growth was malignant excision offered the only hope, and in order to remove the lymphatics which ran in the deep layers a generous area of bladder wall must be removed after mobilisation of the bladder, the operation wound being protected by swabs soaked in silver nitrate (1 in 1000). He concluded by remarking that cases of symptomless hæmaturia should be submitted to immediate cystoscopy.

Mr. HENRY WADE (Edinburgh) urged the importance of immediate cystoscopy for all cases of symptomless hæmaturia, and stated that the mucous membrane adjoining the stem of the papilloma should be observed, as at times there was a roughened area round the base of the papilloma from which fresh tumour tissue might grow, hence it was important to destroy this. He regarded perurethral diathermy as the method of choice for the treatment of the majority of cases of papilloma, and thought the growth should be destroyed at one sitting under a general anæsthetic, warning the patient that a secondary hæmorrhage might occur later when the slough separated, which latter might with advantage be removed in order to obviate the possibility of stone formation. He regarded the following cases as suitable for open operation: (1) Growths of the size of a walnut or larger. (2) Growths situated round the vesical orifice. (3) Cases in which there was a tumour with vesical spasm in persons aged 50 and over. Spasm suggested infiltration. (4) Cases with accompanying disease, such as enlarged prostate, where there was fear of infection. In malignant infiltration the growths were found to be more sessile, the villi were fused, and the surface irregular; for these open operation should be performed. If the growth could

be picked up when the bladder was opened then he did a mucous resection of the growth. If the growth was fixed (it was important to make sure that the growth did not arise from, e.g., the bowel) partial cystectomy was the operation of choice. In these cases, if the ureteric orifice was involved, the speaker left the divided ureter just in contact with the sutured bladder when communication was re-established by natural processes. Complete cystectomy must be done in stages; first cystotomy to confirm diagnosis, then operation for disposing of the ureters either externally or preferably, into the bowel, and finally the bladder was dealt with.

Mr. SWIFT JOLY (London) described treatment and its results in cases with no malignant infiltration; he included cases with thickened epithelium as he did not regard these as malignant. If the tumour was superficial the correct treatment was perurethral diathermy, but if there was even slight infiltration he opened the bladder and did either wide resection or open diathermy, inserting radium round the scar. Before 1913 all cases of papilloma of the bladder were treated by open operation, and he gave an account of 30 cases of single papilloma thus treated with four recurrences, and nine cases of multiple papilloma which recurred, all being fatal. Of 25 cases of single papilloma treated by perurethral diathermy six recurred more than five years afterwards. Multiple growths were common, but with perurethral diathermy good results might be ultimately expected with care and patience. If there was recurrence after open operation for papilloma, the patient was in a worse condition than before, for the secondary growths were often multiple and sessile. Mr. Joly described his retrograde cystoscope, including its uses for growths near the internal meatus and on the anterior wall of the bladder; he used continuous irrigation in the diathermy of extensive growths. For growths in the posterior urethra and in the internal meatus he used a posterior urethroscope.

Mr. R. J. WILLAN (Newcastle-on-Tyne) said that of 68 cases under his care 53 were males and 15 females; their age varied from 23 to 77. In distinguishing between simple and malignant papilloma he thought the best help was obtained from examination of the pedicle, although pathological diagnosis was often fallacious. Of the 26 fatal cases of his own the following were the causes of death: 6, general dissemination; 6, cachexia; 2, local extension into rectum and vagina; 2, hæmorrhage; 1, surgical kidney; 1, heart failure; 1, post-operative shock; 7, cause unknown.

Prof. ANDREW FULLERTON (Belfast) described his technique of cystectomy, which is to cut the ureters above the bladder, not preserving their orifices (as some do), and stressing the importance of drainage by means of a rigid tube passing through the levator ani muscle and the ischio-rectal fossa.

Mr. H. H. RAYNER (Manchester) gave an account of two cases of extensive carcinoma of the bladder, both apparently cured after suprapubic cystotomy and insertion of radium.

Short Papers.

Dr. A. T. BAZIN (Montreal) gave an account of paraffinoma of the rectum simulating carcinoma in a case which was referred to him and which previously had prolapsed piles treated by a course of paraffin injections. The interest of this case lay in the differential diagnosis from carcinoma and in the treatment, which consisted in excision of the affected bowel, the ends being joined up with preservation of the sphincter. In the ensuing discussion Mr. J. P. Kilner condemned the use of paraffin injections, mentioning a case of extensive epithelioma of the skin after injections of the chest.

Prof. DEAN LEWIS (Baltimore) gave an account of congenital arteriovenous fistulæ which presented a very different problem from the treatment of the acquired condition resulting from injuries. The former, by reason of the large number of anastomotic communications, at times baffled treatment.

SECTION OF OBSTETRICS.

SURGICAL TENDENCIES OF MODERN OBSTETRICS.

Prof. E. ESSEN-MÖLLER (Lund, Sweden) said the art and science of midwifery was developing in a manner as important as it was interesting. Physiological research was investigating the biology of pregnancy in normal and pathological conditions. X rays, pelvic measurements, examinations of urine were being applied to detect anomalies and apply prophylactic treatment to lessen the risks to mother and child. And now surgical interference was increasingly taking the place of the older obstetrical methods. In placenta prævia the only resource used to be tamponade until version could be performed. In eclampsia venesection and chloroform were the only means of avoiding new fits. Prophylactic treatment was well-nigh unheard of. The merits of the old midwifery must, however, not be disregarded. The most important advance dated from the revival of the classical Cæsarean section and the invention of the vaginal section; by the latter means it was possible to empty the uterus at any period of pregnancy or labour. The risk or value of an operation ought not to be estimated solely on the primary results, infection, embolism, and the like. The secondary risks were just as important, as, for example, the risk of thinning or rupture of the scar after Cæsarean section, and fear in subsequent pregnancies. Prof. Möller quoted Hirsch, of Berlin, who advocated surgical interference in normal labours in order to avoid examination and risk of infection, alleging that this was the only way of diminishing maternal mortality. He did not agree with Hirsch, although he admitted that owing to the rush for more speed Cæsarean section was now being abused. Labour, he said, was a physiological process in which there should be no interference without due caution and consideration.

Prof. A. DONALD (Manchester) said he represented the old school; there had been, he thought, more innovations and greater advances in midwifery than in gynæcology. When he was a house surgeon at St. Mary's Hospital the visiting surgeons took little interest in midwifery, most of which was conducted in the patients' houses. Maternal mortality was low then probably because they used antiseptic methods rather than aseptic. The introduction of pituitrin into obstetric practice had brought with it dangers of its own. The greatest advance of all had been in the provision of careful antenatal supervision.

Prof. R. J. JOHNSTONE (Belfast) said his maxim was avoid interference. Operation was now so safe that it required more courage to refrain than to operate. He did not think it practicable to carry out aseptic midwifery in the patients' houses, and he always taught his students to use antiseptics.

Prof. R. W. JOHNSTONE (Edinburgh) thought that Prof. Möller's paper should have been entitled "operative" rather than "surgical" tendencies, as surgical technique, especially the use of antiseptics, was always adopted in obstetrics. He agreed with those who advised antisepsis in domiciliary treatment. The Edinburgh school did not favour vaginal hysterotomy for emptying the uterine contents, as they had not had satisfactory results. He referred to abdominal hysterotomy for cases of hydatidiform mole and pernicious vomiting of pregnancy.

Dr. B. SOLOMONS (Dublin) said that a person practising gynæcology could not be a specialist in obstetrics. By patience and observation in labour many operative procedures could be avoided.

Prof. MÖLLER, in reply, said the possibility of Cæsarean section was a great asset to the elderly primigravida, with a breech presentation, where the life of the child was a little uncertain if delivered through the natural passages; he advocated great caution before resorting to it as a routine method. In Sweden, apart from versions and forceps, operative treatment was carried out in a hospital or nursing home.

THE GYNÆCOLOGIST'S TRAINING.

Prof. T. S. CULLEN (Baltimore) said that every surgeon, if he was to get the most out of his work,

must have had a thorough grounding in general pathology and in the surgical pathology of the particular subject which was to become his life-work. He outlined the system adopted at the Johns Hopkins Hospital. Each year five men from the graduating class were assigned to the gynæcological department, during which year they had charge of patients, took histories, and assisted at operations. At the end of the year one of these was selected for promotion; he then became an assistant to the professor of pathology for the next year, when he had ample opportunity to make autopsies, gain knowledge of gross pathology, and familiarise himself with anatomy. He then returned to the gynæcological department, examined and described the material coming from operations, with time to devote to the investigation of gynæcological problems. The fourth year he was made first assistant and for the final year resident gynæcologist in full charge of the department, when in addition to assisting the visiting surgeons, ample opportunity was afforded for doing both major and minor operations. Every gynæcologist should be able to treat any abdominal emergency, and he gave a large series of cases he had encountered where such knowledge was essential.

Dr. J. W. RIDDEL (Plymouth) said that for those who intended to adopt gynæcology and obstetrics as a specialty, and were not fortunate enough to be attached to teaching hospitals, it might still be possible to gain the necessary surgical experience whilst carrying on general practice, where the necessary breadth of mind was also acquired.

Prof. R. J. JOHNSTONE agreed that the gynæcologist should be ready to deal with all emergencies; other lesions were often met with when the diagnosis of a pelvic lesion had been made. All gynæcologists should, he thought, do a year's demonstrating in the anatomy department and also be obstetricians.

Prof. J. P. MAXWELL (Pekin) said he had been both an obstetrician and a gynæcologist; it was only a gynæcologist with clinical experience who could estimate the value and give an opinion on curettings.

Dr. A. E. GILES (London) thought anyone going in for gynæcology should have a broad preliminary training in obstetrics and gynæcology, specialism to come later. He considered diagnosis and experience more important than actual knowledge of abdominal surgery as most operative procedures were similar, and a surgeon accustomed to a certain surgical technique could easily follow others.

PROPHYLACTIC TREATMENT OF ALBUMINURIA.

Dr. L. C. RIVETT (London) dealt with the prophylactic treatment of cases which had had albuminuria in a previous pregnancy. The publications of Young and Gibberd had, he said, stimulated this attempt to guard against permanent renal damage. The essential feature of the treatment was to maintain the urine throughout the whole of subsequent pregnancies at a minimum alkalinity of pH 7·7. In order to achieve this, large doses of alkali were given by mouth. To guard against over-dosage it was advisable to estimate the bicarbonate content of the blood plasma at repeated intervals, especially if any change of the original dose was indicated. The normal plasma content in pregnancy was 0·030 molar concentration. In 85 per cent. of women, however, there was a considerable reduction, the average being 0·0247. The dose found to be safe and effective was usually about 400 grains a day of equal parts of sodium bicarbonate and potassium citrate, but this should be varied according to the reaction of the urine. In some up to 780 grains had to be given, whilst in others it might be reduced to 1–2 drachms. Especial attention should be paid to the bowels, diet, and hygiene, while strenuous exercise was to be avoided. Dr. Rivett gave the clinical histories of a series of 14 cases submitted to the treatment.

Dr. J. YOUNG (Edinburgh) thought the treatment described held out hope for these cases and would probably throw light on the ætiology of the albuminuria of pregnancy. He did not agree that a great many of these cases sustained permanent renal damage as estimated by kidney function tests; he found it only occurred in about 8 per cent. There was evidence of recurrence in about 50 per cent. of the cases who subsequently became pregnant, and in these the tendency to permanent renal damage was greater.

Dr. A. CROOK (Norwich) had used alkalis in many cases of albuminuria with good results. Some cases known to him as chronic nephritic with high blood pressure had shown no albuminuria when they subsequently became pregnant, although there was a tendency to abortion.

Dr. H. L. GREER (Belfast) said he had given alkalis to pregnant women for heartburn and had noticed that they were more comfortable in the latter part of pregnancy. The incidence of eclampsia was diminished in cases treated with alkalis.

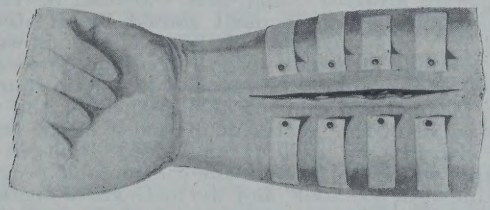
Dr. F. LACEY (Manchester) said he had been regularly examining urines antenatally, and had found a large number containing the colon bacillus. In his experience pyelitis was a common condition.

New Inventions.

SURFACE SUTURES.

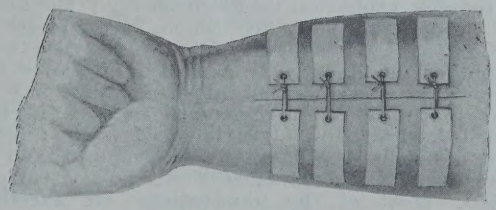
I HAVE devised what may be described as surface sutures ("Surfasutes") for approximating the cut edges of wounds without stitching. They are intended to largely do away with the necessity for using clips, or a needle to suture lacerated wounds. The device consists of strips of specially adhesive plaster cut in various shapes and sizes, each furnished with small smooth eyelets. As shown in Fig. 1 after the

FIG. 1.



laceration has been cleaned, sterilised, and dried, they are laid in interrupted position on each side of the wound, the eyelets being about half an inch distant from the cut edge. A sterile, half-curved needle, threaded with silk, or silkworm gut, is then passed through the eyelets instead of the skin and the edges of the wound can be accurately approximated as shown in Fig. 2. There are many obvious

FIG. 2.



advantages: sterile surface sutures, needle and silk, or silkworm gut, can be carried in the doctor's bag and are always ready for immediate use; the pain of stitching is entirely done away with; no stitch scars are left; there is no danger of stitch abscesses; dressings can be changed without disturbing the surface sutures; the plaster strips are antiseptic and specially adhesive, and therefore cannot slip; and the smooth surface of the eyelets is in contact with the skin and therefore there is no chafing. The eyelets can be raised for the ready introduction of the sutures because the adhesive surface does not run beyond them, but is enfolded to strengthen their insertion. Messrs. A. de St. Dalmas and Co., Ltd., Leicester, are the manufacturers.

HENRY DE P. B. VEALE, M.R.C.S. Eng.

Reviews and Notices of Books.

OTO-RHINO-LARYNGOLOGY.

The Nose, Throat, and Ear and their Diseases. In original contributions by American and European authors. Edited by CHEVALIER JACKSON, M.D., Sc.D., LL.D., F.A.C.S., Professor of Bronchoscopy in the University of Pennsylvania; and GEORGE MORRISON COATES, A.B., M.D., F.A.C.S., Professor of Otology, University of Pennsylvania Graduate School of Medicine. London and Philadelphia: W. B. Saunders Company. 1929. Pp. 1177. 60*s*.

THIS important work is one of those written by a very large number of experts in various departments of their specialty. It retains a predominantly transatlantic outlook, for of the 76 contributors, only five are European, three hailing from Great Britain and two from France. Each section is written by one who has interested himself specially in the subject discussed, and the whole is edited by men of such eminence in laryngology and otology that its appearance is an event of some importance. Since the book is full of valuable detailed information, contributed by acknowledged experts, it seems ungrateful to criticise defects inherent in any work of this type; but some of them could doubtless have been mitigated by a vigilant editorial survey before publication. There is considerable overlapping and unevenness in the treatment of different subjects, and some of the descriptions are disappointingly terse for a book of this size. For example, the section on tonsillectomy teaches that "before proceeding to the removal of the other tonsil it is essential that all bleeding should have been completely arrested," and that "arterial or venous hæmorrhage of any moment should be arrested by ligation." A method of ligation is shown in Fig. 179, but although several ingenious devices are in general use among laryngologists for this purpose there is no description of any method in the text. No account of the treatment of cancer of the larynx and pharynx by radium and deep Rontgen ray therapy, which has lately made considerable progress, is included in the book, and the methods of operation included under lateral pharyngotomy are not set out in sufficient detail. As an instance of the difficulty of adjustment of material under multiple authorship, we note that intubation is described very clearly and at length early in the book under the treatment of diphtheria, and tracheotomy towards the end, after laryngectomy. The important question whether intubation or tracheotomy is the best method of coping with obstruction in diphtheria is dismissed in the earlier section with the words: "Laryngeal diphtheria may require intubation on tracheotomy; the operation of choice is usually intubation." We prefer the advice offered later in the book: "If the case is one of diphtheria and there is a skilled intubator who will not only introduce the intubation tube but will remain in the house to reintubate in case the tube is expelled, intubation is worth consideration; otherwise it is not." The book is well produced, and the editors are to be congratulated on the general plan adopted. Most of the illustrations are excellent, a bibliography concludes each section, and, most important in a work of this scope, the index is full and adequate.

SURGICAL INFECTIONS AND INFLAMMATIONS.

Trattato generale e speciale delle infezioni o infiammazioni chirurgiche. Vol. I. By DEMETRIO B. RONCALI, Director of the Royal Institute of Surgical Pathology at the University of Naples. Naples: Stabilmento Tipografico I.N.A.G. 1929. Pp. 336. L.65.

THIS volume is devoted to general infective or inflammatory processes; a successor will treat of acute and subacute processes such as tetanus, erysipelas, gas gangrene, and suppuration in general, and a third volume with chronic diseases such as syphilis, actinomycosis, epithelioma, and tuberculosis. The preface contains the astounding statement that "clinical medicine persists in asserting with no uncertain voice, and without requiring the permission of any Imperial or Royal Institute, or national or international commission for the study and treatment of cancer, that all malignant neoplasms having a beginning, course, and result identical with those of the majority of processes of parasitic origin cannot logically be otherwise than infections or inflammations, *sui generis*." A second no less astounding statement is found in the historical survey which precedes the classification of surgical inflammations—viz., that Harvey was not the discoverer of the circulation of the blood, but that following on the observation of the non-permeability of the cardiac septum and consequent perception of the pulmonary circulation by Realdo Colombo, the real discovery of the general circulation was to be attributed two years afterwards to Andrea Cesalpino.

The leading idea of this work seems to be that all surgical inflammations are really infections and due to parasitic action which engages in a struggle for life (1) at the site of infection, (2) in the parenchymatous organs, and (3) in the torrent of the sanguineous and lymphatic circulation. Such being the main conception much space is given to recording the views of numerous observers—the index of these authors contains considerably more than 500 names. The work shows considerable erudition, but it may be doubted whether any real advance in surgical pathology is made in its pages. Dr. Roncali's conclusions seem to be that the struggle for mastery at the site of infection takes place between the host, with its histiogenic and hematogenic cells and its antibodies, and the parasite with its bacterial cells and antigens. That this struggle may end in the victory either of the host, resulting in cure, or of the parasite when organisms invade the blood, is no new conception in pathology and this is the main thesis here developed.

THE CLIMACTERIC.

The Critical Age. By GREGORIO MARANON, Professor of Medical Pathology in the Madrid General Hospital; Member of the Royal National Academy of Medicine. Translated by K. S. STEVENS. Edited by CAREY CULBERTSON, A.B., M.D., F.A.C.S., Associated Clinical Professor of Obstetrics and Gynæcology, Rush Medical College of the University of Chicago. London: Henry Kimpton; The C. V. Mosby Company, St. Louis, U.S.A. 1929. Pp. 425. 18*s*.

THIS is an English translation, revised by the author in 1925 from the second edition of Prof. Maranon's well-known work, originally published in Spain in 1918. It is curious that an event of such obvious importance in the life of women as the climacteric has received so little scientific attention in the past. A full account of almost any rare disease would be easier to find in medical literature than a discussion of the clinical aspects and physiopathology of the climacteric. Prof. Maranon points out that the climacteric is not merely a syndrome of genital insufficiency, as was thought until recently, but is the pathological consequence of a complex and constant endocrine crisis like that of puberty, the glandular elements of which can be made out with some degree of accuracy. This greater knowledge of the mechanism of the crisis enables us to interpret clearly and to treat correctly many phenomena which were previously obscure. The classic concept of the climacteric as a simple genital incident disappears. In its place appears the more comprehensive concept of the "critical age," that of a long period of life in either sex the nucleus of which is the genital disturbance, but in the development of which all organic activities participate. The author's comprehensive outlook is well illustrated by a review of some of the chapter headings of the present volume. He first describes the ovarian, thyroid, suprarenal and hypo-

physial factors, and gives an account of the rôle of the vegetative nervous system in the symptomatology. There are other chapters on the psychological problems of this period, the psychic, genital, metabolic, and endocrine symptoms. Finally, a full account is given of the artificial or surgical climacteric, and every aspect of treatment is considered. The book is conceived from the point of view of the general practitioner, but will also be of considerable interest to gynæcologists.

NEUROLOGY.

Revision de la doctrine des localisations cérébrales. By Dr. R. BRUGIA, Professor in the University of Boulogne. With a preface by Prof. PIERRE MARIE. Paris: Masson et Cie. 1929. Pp. 190. Fr.24.

WE are always a little dubious of iconoclastic revisions, especially where they concern any body of doctrine built up on the laboriously collected evidence of generations. It is a priori unlikely that in these modern times such evidence should be based on mistaken ideas throughout, or that had it been built up on insecure foundations this would not have been recognised long since. Prof. Brugia invites us to believe that there is no such thing as a nervous "centre"; that psychical, speech, inhibitory, and sensorimotor "centres" are unreal; that no collections of ganglionic cells effect some "magical" action; and that their place is taken by "zones in which spinal or cerebral receptoric activity precipitates itself, without transformation, in terms of movements." Spinal and cerebral "reflexes" indicate the free passage (more or less direct, more or less rapid) to the organs of expression, of activities derived from the mechanisms of sensibility. It may be so. But after all, what is meant by a "centre," and what by "localisation"? What is the difference between a "centre"—misleading word—and a "zone"? And what of the accumulated clinicopathological data in respect, say, of the visual cortex? What of Jacksonian epilepsy? If there is no specificity as regards neural cerebral mechanisms, nothing but a non-specific "electro-colloidal change," why should any sufferer remain blind, deaf, halt, or aphasic as a consequence of cerebral lesions? Unfortunately, we have ample clinical evidence that compensation and substitution are not prominent characters of cortical function.

Neurological Examination. By CHARLES A. MCKENDREE, A.B., M.D., Associate Physician, Neurological Institute of New York. London and Philadelphia: W. B. Saunders Company. 1929. Illustrated. Pp. 280. 15*s*.

THERE are many small handbooks for the tyro in neurology to slip in his pocket and refer to at the bedside or in the out-patient clinique, until such time as his acquaintance with neurological method becomes second nature and book aid superfluous. This newcomer is welcome for its clarity and completeness. Probably none has ever been written in which the expert has not found something to criticise and something to amend, and Dr. McKendree's is no exception. But it serves its purpose well.

Text-book of Clinical Neurology. For Students and Practitioners. By M. NEUSTAEDTER, M.D., Ph.D., Visiting Neurologist, Central Neurological Hospital, Welfare Island. Philadelphia: F. A. Davis Company. 1929. Pp. 602. $6.

Dr. Neustaedter covers the field of clinical neurology in compendious fashion, his working arrangement being mainly semiological. Under the headings Spastic Paralyses, Flaccid Paralyses, Ataxias, Trophic Disorders, and so forth, he manages to include a great deal of useful knowledge, described in precise terms and amplified by a liberal supply of illustrations. The method, doubtless, has its merits, but its disadvantages are no less apparent. The thalamic syndrome is raked in under spastic paralyses, amyotrophic lateral sclerosis under flaccid paralyses, Charcot-Marie-Tooth amyotrophy under diseases of the cranial nerves (itself a subdivision of flaccid paralyses), facial neuralgia under tremors and spasms. Such classifications are highly unsatisfactory, but after all tabulation is of minor importance. We have noted but few errors or misleading statements. It is scarcely accurate to say in a case of Bell's palsy that if taste is abolished on the anterior two-thirds of the tongue "we are dealing with a middle ear affection." Rod-cells are not, as a matter of fact, "pathognomonic of paresis." Why the "functional neuroses" should be limited to hysteria and neurasthenia is not clear. The clinical descriptions embody the most modern investigations and deserve high praise.

MENTAL DEFICIENCY (AMENTIA).

Fifth edition. By A. F. TREDGOLD, M.D. Durh., F.R.C.P. Lond., F.R.S. Edin., Lecturer on Mental Deficiency, London University. London: Baillière, Tindall and Cox. 1929. Pp. 535. 25*s*.

THIS valuable standard work has now attained its majority, the first edition having appeared in 1908. Since that time great changes and developments have occurred in this field. The importance of mental deficiency as a national handicap and disgrace is becoming more and more fully recognised; its causes, manifestations, and incidence are being studied by an increasing number of gifted and devoted workers, and the efforts which have been initiated to combat it are rapidly gathering momentum. Dr. Tredgold's book has developed with the times, and represents a thoroughly up-to-date survey of the position as it is to-day. Since August, 1922, when the fourth edition appeared, two important events have occurred: the alterations in the legal definitions made by the Act of 1927, and the publication by the Joint Committee of Dr. E. O. Lewis's report on the number and condition of defectives in this country. The treatment of this material has meant a complete revision of the book, and, although the general plan remains the same, many chapters have been much altered, and some have been entirely rewritten. Several illustrations have been added. Dr. Lewis's figures indicated that the number of defectives in England and Wales in 1927 was approximately 314,000, or 8 per 1000 of the population. This represents an apparent increase of no less than 100 per cent. on the figures of the Royal Commission of 1904. Dr. Tredgold's analysis of this striking difference deserves close attention, since the question of whether the incidence of mental defect has really doubled or whether the increase can be accounted for in other ways is very important. He concludes that, although it is not conceivable that the number of defectives has actually doubled, there has nevertheless been a relative and an absolute increase in mental deficiency in the last 20 years. This growth in the severity of the problem, with the corresponding growth in public concern, render even more vital the necessity for well-informed leadership of the kind represented in this book.

THALLIUM ACETATE TREATMENT OF RINGWORM.

Le traitement des teignes par l'acétate de thallium. By Prof. J. G. URUEÑA, Clin. Dermat. Med., Faculty of Mexico. Paris: Masson et Cie. 1928. Pp. 144. Fr.18.

THE author's reasons for devoting a book to a subject on which the bibliography threatens to become voluminous are that European writers are apt to ignore the initial impetus given to it by Mexican workers, that many authorities are inclined to condemn a method which is fraught with certain risks, and that it appeared advisable to concentrate all that is known of the subject in an accessible and readable form. Prof. Urueña and his Mexican

confrères, Cicero, Salvador, Peter, and others certainly deserve credit for having brought the method into the realm of practical therapeutics, but it must not be forgotten that without the pioneer work of Buschke, who first determined the dosage, and whose investigations were carried on for a period of over 20 years, thallium acetate treatment would still be under the strictures imposed on it by Sabouraud in 1913 (Les Entretiens Dermatologiques). The subject is considered in six main sections. Chemical and experimental aspects are first dealt with; a report follows on animal autopsies, well illustrated by photomicrographs, and the remaining sections are devoted to the biological, therapeutic, and toxic reactions in the human subject. It is claimed that a dose of from 5–8 mg. per kilo body-weight is non-toxic for children between the ages of 2 and 12 years. A dose of more than 8 mg. per kilo should not be exceeded although experiments on the guinea-pig and rabbit demonstrated that fatalities do not occur until a dose of 14 mg. per kilo is reached. A second dose, in cases of failure to epilate should not be given when the first produced toxic symptoms, and only after a considerable interval (three months according to general opinion). The value of thallium acetate in the treatment of tinea tonsurans is undoubted, but it is an indisputable fact that the drug attacks healthy hairs in preference to the infected. Prof. Urueña would have earned more appreciation if he had devoted a section to the after-treatment, which is laborious and cannot be left to subordinates; without it failure to cure is almost inevitable. Although much has been written in this country on the subject, not a single British writer finds a place in the bibliography.

PUBLIC HEALTH.

Collected Studies from the Bureau of Laboratories of the Department of Health of the City of New York. Vol. X. Covering years 1920-1926. New York: Department of Health. Pp. 583.

DIPHTHERIA ranks with pneumonia and diarrhœa as a highly prevalent and fatal malady among children of all classes and races in New York. This volume of collected papers from the Department of Health of the City of New York contains, among other matters, reprints of many weighty contributions to the literature of prophylaxis. Dr. William H. Park and Dr. Abraham Zingher are the chief authors, the former being one of the pioneers of therapeutic measures against diphtheria on modern lines over 30 years ago. Most of the papers were first published in 1925, but the facts they contain will bear reiteration.

Taken as a whole they comprise a plea for the educational propaganda necessary to enable mass immunisation of the children of a community against diphtheria to be carried out. And the fact that the weapon for this mass immunisation is now in our hands is eloquently expounded. The first consideration is the Schick test. Provided the technique is correct and reagents are accurately arranged—desiderata often notably lacking—the Schick test appears to be almost infallible. After the age of 2 a negative Schick test indicates complete and lasting security from diphtheria. Indeed, so emphatic are certain authors in this belief that they contend that a patient who has recently shown a negative Schick test and who, nevertheless, presents a faucitis, with diphtheria bacilli recoverable from the lesion, can be classed as a carrier who has by chance developed a sore throat. In other words, a child who has shown a negative Schick test will not suffer from diphtheritic toxæmia. One of the papers contains an analysis of 150,000 Schick tests. By this immense survey the liability to diphtheria was shown to be anything from 60 per cent. to 80 per cent. of all children, the lower figure being given by the returns from schools in less salubrious districts. As a guide to the need of giving immunity by toxin-antitoxin injections the Schick test has its limitations. It is not significant under six months, because at that age a child almost always has a fair amount of naturally inherited immunity. In the age-period of 6 to 24 months the Schick test, though infallible as a guide to the state of immunity or otherwise at the time it is done, is not an accurate guide to the desirability or otherwise of toxin-antitoxin injections because in this age-period the natural immunity is waning and changing. From 2 years to 5 years is the period of greatest susceptibility to the disease. The patient's natural immunity having now become stabilised, the Schick test can be used as a guide to the need of therapeutic immunisation. In later childhood the same remarks apply.

In the reports of therapeutic immunisation an enormous mass of data is presented. They should therefore be studied in the original by all engaged in public health. Therapeutic immunisation consists of three injections of a suitable toxin-antitoxin mixture at weekly intervals to children who are shown by the Schick test to be susceptible to diphtheria. In about 85 per cent. of all children so treated immunity will develop in less than six months, and it will last at least six years. Unfortunately for the children, but fortunately for the purposes of statistical survey, the workers were denied the facilities for therapeutic immunisation in 90,000 susceptible children. These served as controls against another group of 90,000 children whose parents consented. The value of therapeutic immunisation was shown by the overwhelming preponderance of morbidity and mortality in the unprotected group.

LES PHÉNOMÈNES DE RÉPERCUSSIVITÉ.

By Dr. ANDRÉ THOMAS, Physician to the Saint Joseph Hospital, Paris. Paris: Masson et Cie. 1929. Pp. 246. Frs. 32.

IN his introduction, Dr. André Thomas seeks to provide the reader with a definition of "repercussion" or "repercussivity" and with a general exposition of his point of view. When in the bodily organism a given organ is affected it reacts on other healthy mechanisms—this is known as "sympathy," or sympathetic action. But when the physiological activity of other viscera reacts on the affected organ, the phenomena are considered to be different, and the suggestion is that the process should be distinguished as one of "repercussion," and the condition, "repercussivity." For example, the pilomotor reflex can be elicited in the normal subject by simple cutaneous excitation—for the upper limb, by excitation in cervical or axillary regions. Now if the arm has been wounded, with evident skin cicatrisation (peripheral nerves need not have been involved) the reflex appears more rapidly, is of greater intensity, and lasts longer on the affected than on the healthy limb. In other words, a change has taken place whereby the local or regional susceptibility of the skin has increased, and this is regarded as an instance of repercussivity. The abnormal reacts to the normal in an exaggerated way; the resistance of the pilomotor mechanism to stimulation has been reduced, the threshold lowered. Dr. Thomas then proceeds to apply this discovery to a number of differing conditions in which a given part of the organism is already affected, taking for a further example sudoral activity. He finds that in the vicinity of wounds (say in arm or neighbouring region of thorax), homolateral hyperidrosis occurs with some regularity, and he notes the same in respect of vasomotor repercussivity. Proceeding in an ingenious if rather speculative fashion, he next argues that some of the symptoms of the epilepsies can be explained on the supposition that stimuli otherwise inert or minimal produce their effect precisely because of an increased susceptibility—that is, repercussivity—the result of some existing abnormality; similar reasoning is applied to those of migraine, asthma and angina pectoris.

On the whole, this book provides stimulating reading, unwise though it may be to generalise hastily from the relatively restricted basis of observed facts.

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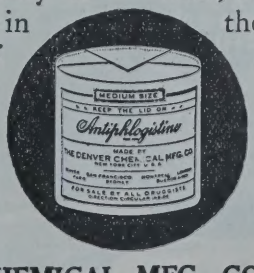

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LONDON: SATURDAY, SEPTEMBER 7, 1929

VITAL STATISTICS OF 1928.

THE first of the three parts, in which the annual vital statistics of this country are now presented by the Registrar-General, contains a wealth of detailed information of which only the salient features emerge on cursory perusal. Much interest attaches to the growth and changes in the age-constitution of the population of England and Wales, and, although not contained in the volume at present under review, this information is already available, and its direct bearing on questions of morbidity and mortality makes it essential to emphasise certain fundamental points. The population of this country, the estimated total of which for 1928 is 39,482,000 persons, has of recent years been undergoing changes in composition which profoundly influence the total annual quota of deaths. The declining birth-and death-rates have resulted in a diminution in the proportion of infants and young children, and a corresponding rise in that of persons in the later life. For instance, the figures contained in the last two censuses show that in 1911 the population aged 0-5 years, and 55 years and over, formed respectively 10·7 and 11·6 per cent. of the total, whereas within the succeeding decennium the proportion of young children had fallen to 8·8, and the 55-years-and-over group had increased to 13·7 per cent. For 1928 the corresponding figures work out at 8·1 and 15·8 respectively. Obviously, the effect of such a change on crude mortality-rates will be unfavourable because of the larger proportion of persons now living at ages subject naturally to heavy rates of mortality, and this emphasises the need for some method of "standardisation" when long-time secular changes in the death-rate are under consideration. The total deaths registered in the past year (460,389) correspond to a crude rate of 11·7 per 1000 population, compared with 12·3 in 1927. With two exceptions this is the lowest rate ever recorded. When the influence of the changes in age distribution is eliminated (as far as can be done by a statistical process) the "standardised" death-rate is reduced to 9·9 per 1000 living, the lowest ever recorded since the beginning of registration. Compared with the previous year, 1928 must therefore be regarded on the whole as exceptionally healthy, the improvement being however practically confined to childhood and ages over 45 years.

Analysis of the separate causes of death shows that the chief contributors, in descending order of importance, are: disease of the heart and circulation, which recently have shown a tendency to increase, respiratory diseases (all forms) from which, possibly owing to the mildness of the winter, mortality in 1928 was abnormally low, malignant disease, diseases of the nervous system, and tuberculosis. The relative frequency of the several important cause-groups is substantially similar to that of the previous year. The deaths registered from tuberculosis, both respiratory and other forms (29,799 and 6824 respectively) are in each case the most favourable returns since the end of the war, which marked the commencement of what since then has been an almost uninterrupted decline. Deaths from cancer again show an increase, the total number, 56,253, being equivalent to a rate of 1425 per million persons living. The distribution of mortality by site affected shows a fairly close correspondence with that shown in the statistics of immediately preceding years. Although relatively unimportant causes of mortality, diabetes and, this year more particularly pernicious anæmia, possess for the clinician a special interest. Mortality from diabetes shows an increase over that recorded in the previous year, but here, as in other years since the introduction of treatment by insulin, the increase is confined to the later ages of life. The introduction during 1927 of liver treatment for pernicious anæmia has coincided with a reduction in the number of deaths from 2655 in 1927 to 2139 in 1928, the crude annual death-rates per million for each of the years of the triennium 1926-8 being 71, 68, and 47 respectively. More careful analysis is obviously required before causal connexion is established between the introduction of a new therapeutic remedy and an improvement in mortality, but the figures at least must be regarded as exceptionally encouraging. Among epidemic infectious diseases, we note in 1928 the continued though slightly diminished prevalence of small-pox, an increase in the incidence of scarlet fever, diphtheria, and erysipelas, a decline in the number of deaths from whooping-cough and influenza (the recent epidemic was just beginning towards the end of the year), and in the notifications of acute poliomyelitis and encephalitis lethargica.

The number of children born in 1928 was 660,267, an increase of some 6000 births over the previous year. This is, apart from 1927, the lowest birth-rate on record. The decline in fertility has its influence on the risk of death to infant and mother. A falling birth-rate is generally associated with an increasing proportion of first births and a decreasing frequency of infants born into large-sized families. Recent statistics have shown how great is the loss of life in these large families compared with that experienced in small families, and although first-born infants fare slightly worse in respect of mortality than do second or third-born, their chance of living through the dangers of the first year of life is, on the average, bright compared with that of infants born into families of more than three. Thus the declining birth-rate leads to a parity distribution of infants increasingly favourable to a low recorded rate of mortality. How much of the improvement in the loss of infant life which has taken place since the beginning of the present century may be due to this circumstance and how much to intentional efforts of control, to which it is more generally attributed, has not yet been thoroughly investigated. Maternal mortality has an opposite tendency. The increasing proportion of first-births with its attendant enhanced dangers to the mother (more especially in certain diseases such as eclampsia) may offer a partial explanation at least of the lack of amelioration in this mortality-rate. The deaths of infants under one year of age show a decline from 70 per 1000 births in the preceding year, to 65 in 1928, the major part of the improvement being attributable to the fall in bronchitis and pneumonia. We note also the continued high level of deaths from injury at birth and congenital malformations; and that, in general, the decline is in the main in the latter half of the first year of life. The inclusion of a table showing for the

[1] The Registrar-General's Statistical Review of England and Wales for the Year 1928. Tables: Part I. Medical. H.M. Stationery Office. 15*s*.

separate sanitary areas the number of stillbirths by sex and legitimacy—the only difference in substance and form of presentation of this from previous reports—offers to workers in the field of maternity and child welfare data of a most valuable nature. County boroughs and other urban districts show, in the aggregate, the highest rates, rural districts occupy an intermediate position, and London has the most favourable experience. Geographically, the order in respect of antenatal mortality of the separate areas is, from highest to lowest: Wales, Northern Counties, Midlands and South (including London). Males experience a stillbirth mortality 16 per cent. in excess of female, and illegitimate show a rate 40 per cent. in excess of legitimate infants. The need for careful study of the factors which operate to produce such wide divergencies is obvious. The record of mortality among child-bearing women offers little scope for optimism; indeed the experience of the year under review is the worst on record since 1911. There were 2920 maternal deaths (a rate of 4·42 per 1000 live births) compared with 2690 in 1927, the increase being found chiefly in the three cause groups, accidents of childbirth, puerperal sepsis, and puerperal albuminuria and convulsions. Although, as we have seen, there are certain changes occurring in the reproductive section of the female population tending towards an increase in the death-rate, we might reasonably have hoped for better results, and are forced to admit how urgent is the need for further efforts towards a diminution in a section of mortality generally considered to be pre-eminently avoidable.

The value of these reports to research and public health workers generally has often been stressed, but too few of them, we fear, yet avail themselves of the manifold opportunities for research into the pressing problems of the day which these admirable collections of data offer.

THE COMPLICATIONS OF VACCINIA.

A SERIES of cases of encephalitis following vaccination which, although few in number, are by their nature distressing, have stimulated the interest and concern of both the public and the medical profession. That vaccination is a procedure of necessity, attended by sequelæ which, in rare instances, are severe or even fatal, has never been denied; the study of the clinical aspects of vaccinia by T. D. ACLAND in Allbutt and Rolleston's System of Medicine, remains the classical presentation of the case. The medical profession as a body, and the educated public to a large degree, have always preserved a sense of proportion, and have weighed in the balance the exceptional disadvantages and the universal advantages. While this remains true to-day, it is yet highly essential that questions of technique, both in the process of vaccination and in the preparation of the lymph, should be reviewed in the light of accumulated experience. A virus originally procured from a lesion in a cow may, to-day, be propagated in a number of different ways, such as by passage through rabbits, and by culture in association with tissues. These modifications are not the technique of JENNER; and our knowledge of "filter-passing viruses" is still so rudimentary that a strict watch must be kept for any evidence of change of type or virulence. Until recently, the gravest dangers of vaccination have been regarded as those of sepsis, common to all skin lesions, and largely avoidable. We have, however, to visualise to-day the possibility—for it is certainly no more—of lesions in organs other than the skin, and in particular, in the central nervous system.

Material is too scanty as yet for legitimately dogmatic inferences in the human subject. But, in the work of Prof. J. C. G. LEDINGHAM and Dr. MARY BARRATT, published on p. 515 of our present issue, we have definite evidence that, in the rabbit, two strains of the vaccinia virus, when applied by scarification of the skin, led to death with visceral involvement in certain cases. It has in the past been suggested that such deaths are due to excitation of a latent infection with a practically universal bacillus of the food-poisoning group—a bacillus which frequently decimates animal houses. The work of Prof. LEDINGHAM and his colleague completely disproves this assumption on histological and bacteriological grounds. Lesions of the type described may be produced in rabbits either by the intravenous injection of the normal cutaneous virus, which is in everyday use in the human subject (though never injected intravenously) or by scarification of the skin by certain modified viruses which, in this country, are not in use. And, as the authors point out, this work clearly shows that they must not be used. It is to be noted that encephalitis was not a feature in any of the affected rabbits, which suffered rather from generalised vaccinia. Such generalisation is a rare occurrence, usually not fatal, in man, and is not associated with encephalitis. The strains of vaccinia virus available are very numerous. Originally they were propagated by serial scarification of calves, or by using the material from one human case to infect another. Early in the present century rabbits were used as intermediates between one calf and another. Still more recently LEVADITI prepared his neurovaccinial virus by injecting the skin virus into the brain of rabbits. He claimed thereby to have "fixed" the virus, so as to make it affect the brains of subsequent rabbits; this has not been confirmed. But his neurovaccinial virus has been propagated in the testes of rabbits and used extensively in Spain on human cases without, apparently, any disadvantages following; as noted in this paper, it is stated to have led to encephalitis in Holland when similarly used.

There seems to be no evidence whatever that any additional encephalitic virus has been picked up from rabbits, which never suffer from this type of encephalitis spontaneously. But propagation in the brain and testes of rabbits is shown to alter the virus, not in the direction of the production of encephalitis, but in the direction of dissemination of the virus, rather than localisation in the skin when applied by scarification. The immediate bearing of this work on post-vaccinial encephalitis is not, therefore, direct. It is clearly proven that there is a choice of material, and that some material is to be discarded. It is suggested that a modification in the properties of vaccine lymph may be induced by the technical methods employed. That is a great advance. It should be more simple, in the future, to carry this process of analysis further, and to determine whether any grounds at all exist for the belief that the vaccinia virus may be modified so as to lead, however rarely, to encephalitis. The practical aspects of this question should not however blind us to the important theoretical issues involved. Few problems of infection have remained so obstinately elusive as that of the "filter-passer"—a name quite inappropriate to the virus of vaccinia at any rate. Its study in tissue culture, and by propagation in the rabbits' testes, open new avenues. Its modification with modified technique may throw new light on its properties. And every new fact ascertained with regard to it serves as a guide to analogous investigations into the nature of other diseases of analogous origin. Perhaps, in the widest interest of humanity,

it is this aspect of the study of vaccinia which we should welcome, rather than the light it throws on the clinical accident known as post-vaccinial encephalitis.

OPEN-AIR BATHING FACILITIES.

THE return of the heat-wave brought a reminder of the disabilities suffered by Londoners who have few opportunities to get rid of their surplus heat in semitropical weather. The sufferers will gladly learn of the plans in the mind of the new Commissioner of Works. Mr. LANSBURY is providing seats in Trafalgar-square and a playing space for children around the Albert Memorial in Hyde Park. He proposes further outdoor shelter for children in Bushey Park and is opening to the public the Cambridge enclosure at the Admiralty Arch. In all the public parks the policy is to be carried out of taking down the railings where they are not required to protect natural beauties. But all this leaves untouched the great desire of all children and most healthy adults to bathe in the open air during a hot spell of weather, and not only to bathe but to have the opportunity of sitting about in undress both before and after the dip; and the proposal to make the Serpentine available for this purpose will be welcomed. Holiday visitors to the continent this year must have been struck by the prodigious increase in the facilities for open-air bathing provided wherever a lake or a bathing pool of any size is available. The capital outlay is small and the running cost is covered by the modest fee paid by the throngs of people of all ages who find refreshment and vigour from bathing in a judicious mixture of sun, air, and water. At the present time the Serpentine is of little, if any, use to women bathers since no provision has been made for dressing and undressing. Their need may be the less urgent since one of the most striking features of the emancipation of women in all civilised countries is the comparative freedom with which her clothing transmits air and sunshine; there has been no effective corresponding movement to secure similar skin culture for the male population. But happily the problem of providing open-air swimming facilities need no longer be complicated by sex differentiation. Honest fears of the harmful effects of mixed bathing have long been set aside by experience, and there is now no possible excuse for refusing the facilities on any such grounds. Indeed, it is refreshing to see how the newer generation accepts, without thought of evil, behaviour that those of maturer years once feared as threatening inviolable principles. A little healthy humiliation may result to the elders from the comments and puzzled questioning of young people on hearing descriptions of ladies in voluminous garments, emerging from discreetly hooded bathing machines and bobbing in the shallow water as they clung to the end of a rope, whilst in a remote part, to which none of them would dare approach, the males carried out more daring feats; for not only the garments but the other restrictions of those days made women swimmers rare among those whose visits to the seaside were an annual event. By insistence upon sex these elaborate taboos, with their opportunities for more or less indecent jest and allusion, cultivated, or perhaps indicated, the Peeping Tom state of mind. If we apply the standard of "evil to him who evil thinks" we must congratulate the present generation, for in the less populous seaside places anyone once familiar with the old régime must be impressed by the way young people of both sexes, in the absence of formal rules, regulate their undressing and dressing without offence and without self-consciousness. The healthy human figure is beautiful, and the student of human nature may wonder how it came to be associated with those taboos from which we are now freeing ourselves with benefit to health and happiness and with no detriment to our morals. If he lives long enough he may learn, for the history of fashion either in clothes and habits of thought gives little support to the idea that the sensible conventions now adopted will remain stationary. They will inevitably change—whether in the direction of what we would now call greater licence or in that of greater prudery. In either case we do not anticipate that any obstacles will be placed in the way of mixed bathing in our time. The plans of the Commissioner of Works accord with the trend of the times, and it is to be hoped that they will take some practical form before the summer comes to an end.

Annotations.

"Ne quid nimis."

THE INTERNATIONAL CONGRESS OF OPHTHALMOLOGY.

THE Ophthalmological Congress which was opened by the Queen Mother of Holland at Amsterdam on Thursday afternoon resumes the long series of international gatherings which have twice been broken by wars in Europe since the first meeting at Brussels in 1857, when the ophthalmoscope was newly discovered and pioneers like von Graefe and Donders gave the fruits of their experience. The fourth meeting appointed for 1871 in Berlin was prevented by the Franco-German War, and the twelfth planned to take place at Petrograd in 1914 was not held, although the communications prepared for it were circulated to members. The present Congress is guided by the rules and by-laws drawn up by a committee under the chairmanship of Mr. Treacher Collins which met in conference at Scheveningen in 1927. Papers printed beforehand include reports on visual standards, standardisation of perimetry, of visual acuity, of the notation of the meridians of astigmatism, and on the light-sense test, on uniformity in the programme of teaching ophthalmology for medical students and future ophthalmologists, and on unification of the standards for airmen, motor drivers, railwaymen, and sailors. A directory has been brought out of all practising ophthalmic surgeons in the world, of all ophthalmological societies, institutes, hospitals, and asylums for the blind, and of ophthalmic journals. This alone makes a volume of over 350 pages, of great value for reference purposes. The list of papers to be read at the present Congress includes 232 items, each of which is abstracted in five languages—English, French, German, Italian, and Spanish. The programme obviously covers a wide range of subjects, many of them of international interest, and the promoters are to be congratulated on the achievement of a Congress which is likely to be a new landmark in the science and practice of ophthalmology. The gathering should not only advance knowledge but engender a spirit of mutual respect and esteem among the participants. Besides the devoted work of Mr. Collins the arrangements, as far as they concern the English-speaking world, owe much to the labours of Sir John Parsons, Mr. Leslie Paton, and Dr. de Schweinitz, of Philadelphia.

THE PATHOLOGY OF TRYPANOSOMIASIS.

TRYPANOSOMES are harmful in many ways. Within the vessels their mere presence and multiplication may block capillaries and do mechanical damage; during their life or after their death they may form toxins causing perivascular inflammation. In the serous cavities they may multiply and cause irritation, giving rise, e.g., to pericarditis; invading the tissues they may set up inflammation and degeneration. The presence of trypanosomes in the tissues after death is not often reported. P. Regendanz and R. Hoeppli of the Hamburg Tropical Medicine School, who have just published [1] the outcome of their prolonged

[1] Arch f. Schiffs-u. Tropen-Hygiene, July, 1929, p. 376.

investigations, believe it to be because autopsy is delayed too long, for the parasites are altered by post mortem changes more quickly in the tissues than in the vessels. The flagella disappear first, then the protoplasm assumes a rounded shape and loses its special staining affinities; the blepharoplast and nucleus persist longer, but are apt to be mistaken for bacteria unless examined under a high power, when their irregular edge and lighter central staining distinguishes them. Subjects of trypanosomiasis are apt to suffer from peri- and myo-carditis with dilatation; is the infection brought by the blood stream? The Hamburg investigators think not, but due rather to an extension from the pericardium within which the trypanosomes are growing; morbid changes are more advanced in the epicardium than in the heart, and in the superficial layers of the myocardium than in the deeper. The first histological evidence of trypanosome infection is an œdema which may be due to toxins, though such toxins have not yet been isolated. Into this œdematous area the trypanosomes having penetrated, they increase, setting up a small-cell infiltration similar to but less in degree than that of bacterial inflammation; the muscle cells degenerate later. Trypanosomes, living and moving, may be found in plenty in the fluids of serous cavities and in that of the conjunctival sac, even when they are but scantily present in the blood. Conjunctivitis is not unusual in trypanosome-infected animals; iritis and keratitis also occur, and living trypanosomes have been found in the anterior chamber. Thence they make their way along the lymph stream into the subconjunctival connective tissue, causing œdema and inflammation, and so reach the conjunctival sac, where they are most numerous about the fornix. This sequence of events was first observed with *T. equiperdum*, although most of the work was done with *T. gambiense* and *T. rhodiense*, of which the latter gives rise to the more acute infection in apes. Whether the growth of trypanosomes in serous cavities accounts for relapses will be discussed in a subsequent paper.

MINIMAL DOSES OF HEAVY METALS.

DR. Guiseppe Sabatini, professor of special pathology in the University of Rome, has been investigating[1] the effect of injecting into the circulation extremely small quantities of salts of the oligo-dynamic metals, such as copper, zinc, and mercury. The vogue of the infinitely small, he remarks, is continually extending its influence in biology, and even in clinical medicine. He has been impressed by the demonstrations of "ultravirus," of aphanozoa, of fatal anaphylaxis produced by minute doses of serum, of the powerful effects of imponderable amounts of hormones, and of the posology in fractions of a decimilligramme of pure alkaloids. In Italy there has been a tendency to reconsider the doses of commonly used drugs, and claims have arisen for remarkable effects from doses conspicuously smaller than those generally employed in therapeutics. It may easily be predicted that the edifice of necessary and sufficient therapeutic doses fixed by scientific medicine is not really on the verge of collapse, but according to Prof. Sabatini we should be guilty of stupidity to ignore such investigations altogether. His own experiments were inspired by the observations of A. van Egmond on the action of certain drugs on the bundle of His, and on the production of heart-block by the action of oligo-dynamic metals. This author showed that simple contact of the bundle of His with a copper wire 2 mm. in diameter caused heart-block. Having excluded the possibility of thermic effect, pressure, and galvanic current, he concluded that it was due to an infinitesimal chemical action on the cells in the bundle. In the same field of observation, Stock, in 1926, maintained the possibility of mercurial intoxication in man caused by the amalgam used in stopping carious teeth, and Seifert, examining several hundreds of syphilitic patients belonging to every social grade, noticed that about 80 per cent. of them had no teeth filled with metallic stopping, while in a series of patients with many filled teeth syphilis was much less prevalent than in others, and he suggests that the minute doses of mercury absorbed by the organism in these subjects may act as a prophylactic. The researches carried out by Prof. Sabatini fall into five groups: (1) chloride of copper, one milligramme dissolved in 2 c.cm. of distilled water; (2) chloride of zinc, in the same proportion; (3) bichloride of mercury, in the same proportion; (4) bichloride of mercury, half that strength; and (5) controls consisting of injections of 2 c.cm. distilled water only. These quantities were injected into a vein and samples of blood taken after 1 hour, 8 hours, and 24 hours. These samples were examined as to the number of red cells, the number of leucocytes, the leucocytic formula, and for glycæmia. The specimens showed very definite changes, the number of red cells and leucocytes being distinctly, and sometimes conspicuously, increased, while the glycæmic content was raised to about double the normal. The changes were transitory and a return to the previous condition took place after 24 hours. Dr. Sabatini is continuing his investigations especially with other salts.

[1] Policlinico, Medical Section, June 1st, 1929, p. 281.

RESEARCH IN TUBERCULOSIS.

TWO years ago the Prudential Assurance Company provided a new pathological department for the City of London Hospital at Victoria Park, and the report for 1928, recently issued, testifies very clearly to the value of this benefaction. The laboratory has examined nearly 10,000 specimens from the wards and out-patients during the year, and the report includes also reprints of four papers published by Dr. S. Roodhouse Gloyne and his assistants. The chief one is a useful review by Dr. Gloyne of the clinical pathology and bacteriology of fluids obtained by tapping the pleura. With Dr. J. R. Simpson he has also attempted, and failed, to produce tuberculous meningitis in rabbits. It is curious that generalised infections produced by intravenous injections in these animals hardly ever involve the meninges, and it is suggested that this is so because the bacilli do not lodge in the cerebral vessels; tuberculous meningitis is perhaps always preceded by lesions in the choroid plexuses. Lesser papers deal with the viability of tubercle bacillus at freezing temperature and with the relationship between syphilis and tuberculosis which seems to be very small. The whole report indicates a lively response to the help given by the Prudential Company and augurs well for the extension and expansion of activity which future years will doubtless show.

LUNATICS AS A PUBLIC DANGER.

Lord Alness, the Lord Justice-Clerk, has been commenting in the Glasgow High Court upon the danger to the community from the freedom allowed to persons of unstable mind. In the case to which our Scottish correspondent draws attention on p. 525 a man had been proved to be of unsound mind and unfit to plead. He was also described in the evidence as being in the same mental condition when released some time earlier from a mental institution. While thus at large he had shot a young woman dead and had attempted to shoot a man. The Lord Justice-Clerk, while refraining from attributing blame to individuals, suggested that the general position was disquieting and that the authorities should inquire whether some machinery could not be devised to prevent the recurrence of such deplorable incidents. Similar comments might at any time be made in England where full investigation has been officially made without any attempt to give effect to the resultant conclusions. Royal Commissions may make recommendations but, until some prominent personage is killed by a lunatic, it may be difficult to translate those recommendations

into law. More than one judge has warned the public in England of the consequence of exposing members of the medical profession to the risk of huge and capricious awards of damages for alleged negligence. When a jury gives a verdict of this nature, medical practitioners are scarcely encouraged to sign the certificates which are the statutory preliminary to a magisterial order for the detention of a lunatic in a suitable institution for treatment.

There is an allied question whether issues involving an exact estimate of medical skill are best determined by juries consisting entirely of laymen. In this connexion a correspondent in the daily press has lately been giving an interesting illustration. He describes his experiences as foreman of a jury at a trial at the Old Bailey in a case involving charges of fraudulent income-tax returns. The nature of the issues involved frequent references to columns of statistics and complicated figures and calculations. A woman member of the jury said to him at one point, "I do not know what they are all talking about: this is not a case that women should be asked to try, do you think?" So frank a confession by a layman faced with technical issues is significant. The correspondent remarks upon the incongruity of expecting persons who have had no financial training to adjudicate upon facts in which complicated figures form the material. How is it any more reasonable to expect 12 laymen to adjudicate upon complicated issues of medical diagnosis and treatment?

THE TASTE OF CHLORINATED WATER.

IT is well known that although one part of free halogen in a million of water will render drinking water sterile, yet the taste produced is offensive to most people. As this taste resembles that of iodoform and is not like that which would be produced by free chlorine itself, its investigation is a matter of considerable interest, both on theoretical and practical grounds. In the *Medical Officer* of August 17th Mr. B. A. Adams describes some work done by him which seems to show conclusively that the taste is to be attributed to the action of chlorine on salicylic acid or some of its derivatives extracted from the leaves or twigs of certain willows and waterside plants, such as the meadow-sweet (*Spirea ulmaria*). Mr. Adams points out that although it is usual to attribute the development of taste to phenolic bodies, it appears that only those which are associated with coal-tar products will produce the taste, and in some cases these have been shown not to be present. The phenols found in vegetable and animal substances do not appear to yield the taste, but natural salicylic acid (which cannot be suspected of containing even traces of phenol) will give a faint taste when present to the extent of only one part in a hundred millions of water if treated with 0·25 part of chlorine, as will sodium salicylate, phenyl salicylate, salicylaldehyde, and salicyl alcohol. On the other hand, salicin, methyl salicylate, acetyl salicylic acid and coumarin do not give the taste in any concentration examined. As salicin, which is an easily hydrolysed glucoside, occurs in large quantities, together with its appropriate hydrolytic enzyme, in many willows and poplars as well as in meadow-sweet, all of which are, along with other salicyl compounds, typical waterside plants, Adams experimented with this and with other natural salicyl compounds. He found that infusions of willows (*Salix fragilis* and *alba*), poplars (*Populus tremula*, *candescens*, *alba*, *nigra*, *deltoida*, *italica*), and meadow-sweet are all capable of producing an iodoform taste on chlorination, whilst the sallows do not invariably give the taste, and a large variety of other trees do not do so. The taste tends to be prevalent in autumn when there is a great fall of leaves and small twigs into the water, by which willows and meadow-sweet grow. It is easy, therefore, to see that an appreciable amount of salicyl compounds may thus pass into solution, and when the water, which is likely at this time to need chlorination more than at any other time, is so treated the taste is developed. A remarkable point brought to light in this research is the non-formation of taste when ammonium salicylate is chlorinated, a fact which throws some light on the use of ammonia in removing the taste from chlorinated water. Direct proof of the presence of salicylic acid or its derivatives in the water of any river or other natural water would be very difficult. The American workers who investigated the organic matter of lakes found it necessary to evaporate hundreds or thousands of litres of water in order to obtain enough to examine. Besides this it by no means follows that evaporation will leave all the organic matter behind. We feel, however, that Mr. Adams has sufficiently maintained his thesis, more especially as his experiments were made with well water, which may be considered as originally free from either salicyl compounds or their chloro-derivatives.

INSTITUTES OF RADIOLOGY.

THE twelfth volume of the series called "Methods and Problems of Medical Education," issued by the Rockefeller Foundation, is concerned with rontgenology and radiation work in general. Beautifully printed and lavishly illustrated it describes 39 installations in different parts of the world, five of them in Britain—Edinburgh, Liverpool, Manchester, Cancer Hospital, and Guy's. Despite the general title this volume will be of less interest to teachers than to those engaged in the therapeutic and diagnostic applications of radiations. For these it will be particularly useful, because the technical details of the arrangements are really important, and not, as is often the case, matters of preference or prejudice. Especially informative is Dr. A. E. Barclay's description of the X ray department which he organised at the Royal Infirmary in Manchester, for he gives careful and detailed lists of the equipment and personnel, with their cost, which are needed for hospitals of different sizes and varying characters, and discusses many of the problems of construction and arrangement with much informative detail. The account of the Finsen Institute in Copenhagen is also conspicuous and gives us a pleasing photograph of Finsen's statue in the grounds. Careful study of books such as this should do something to correct the parochial experience which our in-bred hospitals too often show.

PREVENTING DIPHTHERIA IN NEW YORK.

IT is now on record that in certain districts in America diphtheria has been almost entirely eliminated as a result of immunising all children with toxin-antitoxin. In Auburn, for example, the death-rate from diphtheria has been reduced from 38·4 to zero, while New York State, which began a campaign three years ago, has a mortality and morbidity rate considerably lower than New York City. On another page we comment on a collection of studies from the laboratories of the health department of New York City which show the overwhelming evidence now available of the value of therapeutic immunisation. These considerations, coupled with the fact that in New York City there were last year over 10,000 cases of diphtheria with 642 deaths, led to the formation of a "Diphtheria Prevention Commission," under the presidency of Mr. Thomas W. Lamont, which launched a campaign early this year. The methods employed in this campaign and some of the early results are recorded in a handbook, entitled "How to Protect your Children from Diphtheria," which has been prepared under the supervision of Dr. Shirley W. Wynne, commissioner of health for the City of New York, and edited by Mr. E. Fisher Brown. Mr. Lamont gave an address to the editors of the various city newspapers at the Harvard Club in January, and leading articles appeared in the more important journals during the following week indicating the scope of the campaign. Some of these are reproduced in the handbook. The Health Department wrote to 11,345 practising physicians asking them to

circularise their patients with notices prepared by the department urging immunisation, and it was arranged to approach 150,000 families for a test demonstration with the coöperation of five medical societies. Toxin-antitoxin is prepared by the Health Department and is available at 750 pharmacies where physicians can at any time obtain what supplies they may need in their private practice. At the same time 44 stations have been opened in various parts of the city where free immunisation treatment can be given. Dr. Wynne is quite clear as to the exact part which the private practitioner and the public health official have to play in the campaign. At the inaugural luncheon he said:

> The public owes the medical profession a more liberal attitude in the matter of fees. The public must learn to pay for preventive medicine as ungrudgingly as it pays periodically for its theatre tickets and moving-picture shows. I am not willing that the Department of Health be the official doctor, nurse, clinic, and hospital regardless of the ability of the individual citizen to pay the doctor for such a service. Nor is the department prepared to undertake all these services. We are, however, willing and prepared to immunise every unprotected child where its parents for any reason are unable to pay for the same.

Ten years ago the Schick test and toxin-antitoxin immunisation were introduced into the municipal schools in New York, and in examining the results it is estimated by Dr. William H. Park that the amount of diphtheria reported among those receiving immunising injections was only a fifth of that among those not injected. Out of 500,000 immunised not a single patient suffered any ill-effects. These results are excellent, particularly when it is remembered that of all children receiving toxin-antitoxin probably only 80 per cent. are definitely immunised, but it is desirable to extend the protection to all children between the ages of 1 and 9, estimated at 750,000, in the city of New York. It is with this object that the new campaign has been started, and already in March it was possible to state that there had been since the beginning of the year a decrease of more than 30 per cent. in the diphtheria rate and in the death-rate. With close coöperation between public health authorities, parents, and doctors, it is hoped to eliminate the scourge of diphtheria from the city where Dr. Park originated his method of protection.

APPENDICITIS IN PREGNANCY.

SINCE a large percentage of pregnant women complain of abdominal pain, vomiting and other symptoms which disappear either during or after the pregnancy, cases of acute abdominal disease occurring in pregnancy may be masked. A. L. McDonald in a recent paper[1] compares a large series of cases of appendicitis in pregnant with another series in non-pregnant women. Apart from difficulties in diagnosis pregnancy increases the dangers of the disease. As the uterus rises in the abdomen, the cæcum tends to be less protected. The omentum is generally to be found resting on the uterus, far removed from its normal situation in close relation to the intestines, and some authorities state that the uterus as it rises pulls the cæcum away from the less absorbent pelvic peritoneum. General peritonitis is therefore on theoretical grounds more likely to follow perforation of the appendix during pregnancy, and local abscesses to be less frequent. Dr. McDonald's statistics support this view. The series he has used as a control is that collected by E. P. Quain, consisting of 1000 cases, and he has compared with these a series of 204 cases occurring in pregnant women, studied by E. Jerlov, and a group of 70 investigated by himself. The control series show general peritonitis in 16 per cent., and localised abscesses in 29 per cent. In the pregnant patients—a much smaller group—these figures are exactly reversed, namely, general peritonitis in 29 per cent., and a localised abscess in 16 per cent. The mortality of appendicitis complicated by general peritonitis, which is 11 per cent. in Quain's cases, rises to 30 per cent. in the group of pregnant women, while the mortality with a localised abscess rises from 2.4 per cent. to 23.5 per cent in pregnant women. The lesson of the investigation is that delay in the diagnosis of appendicitis is even more dangerous during pregnancy than at other times, and that every effort should be made to operate on cases of appendicitis during pregnancy before the infection passes beyond the appendix. The mortality is greater when the patient aborts or goes into premature labour; the author notes, however, that the onset of labour depends largely on the severity of the toxæmia. Many cases do not die because they abort, but abort because they are dying. Pregnancy does not in any way modify the surgical treatment of acute appendicitis. Every effort must be made to prevent the onset of labour; if delivery is inevitable, it should, if possible, be vaginal and not abdominal.

[1] Amer. Journ. of Obstet. and Gyn., 1929, xvii., 110.

TWENTY YEARS' EXPERIENCE AT A FEVER HOSPITAL.

THE special characteristic of the study of scarlet fever, diphtheria, and enteric fever, recently published by the Medical Research Council,[1] is that one observer, Dr. E. W. Goodall, was responsible for the clinical work throughout the period under survey. The statistics, which refer to more than 21,000 cases of scarlet fever, 15,000 cases of diphtheria, and 2000 cases of enteric fever, have, therefore, a peculiar value, since those already available in the Annual Reports of the Metropolitan Asylums Board and elsewhere have been compiled from several hospitals, and conclusions drawn from their study may have been vitiated by variations in standards of classification. Tables are given here showing for each disease the age distribution, the variations from year to year, the seasonal distribution, and the age and seasonal incidence of complications, also the relation of complications to form of disease, and the fatality. The statistics here presented do not show any relation of school closure during the summer holidays to the incidence of scarlet fever, though in diphtheria a diminution was found. Since a reduction of scarlet fever cases is found almost every year for the holiday period in the notification statistics for London as a whole its existence cannot be doubted. The statistics for the whole of London certainly contain a moderate percentage of erroneous diagnoses which have been eliminated from the figures supplied by Dr. Goodall, but the diminution is too great to be attributed to this cause. Another discrepancy between the two sets of figures concerns seasonal variations at different ages. A table in the study just published shows a marked difference of seasonal variation between the first and second decades in scarlet fever, though in diphtheria there was little change. The charts published in the M.A.B. reports indicate that the seasonal variation is always largest in epidemic years, and may be quite absent in years of low prevalence, like 1903 and 1910. The large epidemics of 1907 and 1914 must be considered in relation to the figures presented. The tables dealing with form of disease, complications, and fatality mostly break new ground. The characteristic autumn rise in scarlet fever is shown to be almost entirely due to the mild cases; the distribution of septic cases throughout the year shows no regular trend. Among scarlet fever complications albuminuria is rather more frequent in late summer, but otitis, nephritis, and adenitis more so in the first half of the year. Otitis is much more frequent in infancy, and the incidence regularly decreases with age, both in scarlet fever and diphtheria. Albuminuria and adenitis follow the same course, but the differences are less marked. Nephritis is less common under 4 and over 20 than at inter-

[1] Medical Research Council Special Report Series, No. 137. Scarlet Fever, Diphtheria, and Enteric Fever, 1915–1924; a Clinical-Statistical Study, by E. W. Goodall, M. Greenwood, and W. T. Russell. H.M. Stationery Office. Pp. 58. 2s.

mediate ages. All complications, except relapse and secondary tonsillitis, are much commoner after septic than after mild scarlet fever. With one or two exceptions complications were less frequent in the quinquennium 1910–1914 than between 1895 and 1899; but the intervening periods show higher rates than either. In diphtheria, laryngeal and rhinorrhœal forms occur more frequently in young children. At ages over 25 years 98 per cent. of the cases are faucial. Albuminuria shows a maximum age incidence at 6 years, and paralysis at 9 years. Otitis is most frequent in infancy. As with scarlet fever, complication-rates are somewhat lower in the last quinquennium. In enteric fever complications become more common as age advances and were higher for females than males, with the exception of otitis. In all three diseases the case fatality decreased during the periods, but whereas in the first two diseases the decline was regular, in enteric fever a minimum was reached in the third quinquennium, and a rise occurred in the fourth. The authors of the report point out that data referring to patients not wholly drawn from one district, and to a period of change in the extent to which the public have resorted to institutional treatment of the diseases, cannot throw light on the real incidence of these diseases, while even the statistics of fatality must be interpreted with caution. On the other hand the expert statistical analyses of the forms and complications of the diseases here presented are of unusual value and interest.

ÆSTHETICS AND MENTAL DEFICIENCY.

IN the annual report for 1928–29 of the Metropolitan Asylums Board Dr. E. B. Sherlock criticises the current standards of diagnosis of mental deficiency. Like many other examiners he holds that too much stress is laid on the cognitive side and upon the results of the application of intelligence tests, other aspects of their psychological make-up being ignored. More important than testing is the question of guidance and training, and Dr. Sherlock makes a plea for the development of the æsthetic sentiment in mental defectives and for the cultivation of such sense of beauty as they possess, as a contribution to their happiness and the moulding of their personalities. A preliminary difficulty to be faced is the fact that the æsthetic sentiment is conditioned very largely by the stage of intellectual development; Dr. Sherlock therefore set himself to discover in what degree æsthetic sensibility is normally present in defectives. A true æsthetic sensibility is a fairly late product of development, even in the normal. Its earliest manifestations can only be some evidence of interest or pleasure in objects usually regarded as beautiful, coupled with practical attempts at reproduction or self-expression in some artistic form. It was in these two directions that Dr. Sherlock sought for evidence, taking as his subjects the defectives in Darenth Training Colony. He describes two tests of sensitivity: one, in which the child's opinion of the pleasantness or otherwise of a variety of odorous substances was required, and a second, in which he collected the pleasurable impressions of the children derived from a performance of Cinderella. As a practical test each child was required to make a drawing of a church. It may be questioned whether inferences could fairly be made from the responses to these sample tests. Dr. Sherlock does not claim that the inquiry revealed either any sensitivity or talent in defectives different in kind from that of normals, and in degree both were, on the average, below normal. As tests, then, they reveal nothing beyond what is already known. In our view no test of æsthetic sentiment is ever likely to contribute much to a diagnosis of mental deficiency, the ultimate criterion of which is social inefficiency. The cynic might point to instances of supernormal æsthetic development accompanied by almost complete incapacity to attend to the practical affairs of everyday life. The real value of this or any similar inquiry rests rather in the fact that it may reveal educational possibilities in individuals. Where a definite sensitivity or talent is shown, it is the duty of the educationalist to foster it. Modern educational systems are not neglecting this matter. The cultivation of the child's sense of beauty, whether in nature or art, is an integral part of education to-day, perhaps more in the elementary than in the secondary school. That mentally defective children are not without some elementary sense of beauty, in the form of appreciation of rhythm or tone, or of relations of forms and colours is well known to special school teachers. Dr. Sherlock is disposed to doubt whether the possibilities in these directions are being fully utilised and the question he has raised appears to merit further inquiry.

STANDARDS OF FITNESS IN AIRMEN.

WE do not yet know the name or even the nationality of the winner of the Schneider Cup, but we know a good deal about his physiological make-up. He will have a visual acuity of 6/6, he will be able to exercise single vision binocularly, at very near range, and to maintain binocular vision under increasing disability. His visual field will be wide and his colour sense accurate. His Eustachian tubes will be free and efficient to regulate and equalise the continual changes of atmospheric pressure. His respiratory efficiency will be high, and his chest expansion good, and his cardiovascular system equal to the maintenance of an adequate circulation under adverse conditions of strain and low oxygen pressure. In other words, he will possess the physical and physiological attributes of any good pilot as well as a neuromuscular coördination above the normal, but in addition he must have special ability of a high order. As Sir Samuel Hoare has pointed out, it is the human side of the enterprise for the Schneider Cup that is more valuable and enthralling than the actual production of a record machine. At an early stage in the development of the Royal Air Force it was found that the existing state of medical knowledge was insufficient to entitle medical officers to give trustworthy opinions on the unsuitability or otherwise of candidates for flying. It was found that men who were apparently fit in every way, some of them even noted for their athletic prowess, were unable to acquire the art of flying, or having acquired it painfully and expensively, never became safe pilots. The question really turned on the possession of peculiar aptitudes—a question to which, of course, industrial psychologists have been devoting their attention for many years in other fields; but which at once assumed an urgent practical importance when it had to be answered, and to begin with in the stress of war, concerning the profession of aviation, in which ineptitude spells calamity. Nowadays the medical tests to which the candidates for the flying services are exposed, whilst making no pretence that every candidate selected by them will turn out to be a good pilot, are definitely selective in the sense that they are directed definitely towards the ascertaining of capacity for performance in a particular field—viz., aviation.

Some of the standards exacted by the medical selectors of flying personnel for the R.A.F. may be quoted. It is not surprising that sickness in swings or trains should debar candidates from admission, or that visual acuity of high degree is insisted on. But it is noteworthy that, according to the Manual for Medical Officers of the Royal Air Force, no candidate, whatever his visual acuity, may be passed into the service who reveals a manifest hypermetropia of + 2·00 D. sph. or over. The reasons for this restriction are that (1) the continued effort to focus rays correctly on the retina is apt to induce a tonic action of the ciliary and internal recti muscles, which tends to produce errors of judgment of distance in flying; (2) loss of accommodation is liable to occur under flying conditions, leading to bad landings; and (3) quite apart from flying the hypermetropic eye is more easily fatigued by close work or glare. Lack of true ocular balance is the most common cause of bad landings. Exophorics (sufferers from external lateral deviation)

tend to flatten out their aircraft too early, having judged the ground to be nearer than it is; conversely, esophorics are inclined to fly into the ground. The need for excluding those with defective visual judgment from the flying services is emphasised by the distortion of objects when seen from the air—the verticals are fore-shortened, shadows are viewed from an unfamiliar aspect, and the pilot's judgment of distance is anyhow likely to be disturbed by the unusual speed at which he is travelling. At one time, in some countries great importance was attached to the supposed "motor-sensing functions" of the vestibular apparatus, but it has been found that its reactions to rotation are not reliable indications of flying ability. The so-called otolithic functions of the semi-circular canals afford little information about position in space, which is estimated chiefly by deep muscle sensation; their integrity is nevertheless important for air work, probably for the exertion of steady, subconscious neuro-muscular control. The rotatory chair is used now not so much as a test of the vestibular apparatus but as a means of bringing out abnormal reactions such as giddiness, nausea, vertigo, or anxiety in men whose history throws some doubt on their ability to perform aerobatics. If an aeroplane is spinning, and thus out of control, the human subject must himself be fit to take the action necessary to stabilise the machine. To test this power he sits on a chair as in an aeroplane, with eyes open and directed inside the knee furthest from the direction of spin, and is then subjected to a relatively fast spin ten times in 20 seconds. In fit pilots, especially those accomplished in aerobatics, rotation has little effect on pulse-rate or arterial pressures. A rise in pulse-rate and systolic and diastolic pressure is associated with vertigo and nausea, a fall in diastolic pressure with fainting; while in anxious subjects an anticipatory rise of pulse-rate and systolic pressure before rotation may or may not be accentuated by rotation.

Broadly speaking, it may be said that the tests, of which only a few examples have been given, are directed to ascertain: (1) that the candidate possesses sound physiological control over his circulatory, respiratory, and nervous systems, on which the stresses of flying and of altitude chiefly fall; and (2) is in possession of sound perceptive faculties and of a sound effector motor organisation through which his perceptive faculties can function; the elucidation of the latter factor is sought by the aid of tests of a definitely vocational character. Much has been found out, but much still remains to find out. It might be thought that experience of this kind had no immediate bearing on general medical practice, but this is not true for any practitioner who regards every patient who comes to see him as a candidate under examination for his fitness to perform his allotted or chosen task in life. His chief concern is in the patient's capacity for such performances. The standard use of physiological and psychological (using the word in its broadest sense) tests and of medical examinations of men in apparent health, conforms with the ideals of clinical medicine set forth by Sir James Mackenzie when he started his clinical research centre at St. Andrews—namely, to discover the signs and symptoms of failing health in the pre-sickness stage.

Lieut.-Colonel A. J. H. Russell, I.M.S., has been appointed medical assessor to the Royal Commission on Labour in India and will accompany the Commission during its tour through India this winter. Colonel Russell has been Director of Public Health in Madras since 1922.

Sir John Campbell, who died at Belfast on August 31st, was senior surgeon to the Samaritan Hospital for Women and consulting surgeon to the Maternity Hospital. He figured largely in public life, being chairman of Convocation of Queen's University and representative of the University in the Northern Parliament of Ireland.

The Clinical Interpretation of Aids to Diagnosis.

A Series of Special Articles contributed by Invitation.

XLII.—SIGNIFICANCE OF THE ACID BASE BALANCE IN THE BLOOD.[1]

SOME 16 years ago, as can be readily seen from a study of the literature of the time, the disturbances of the acid-base balance in disease were subjects of controversy and vague speculation. Since then clear ideas on the subject and methods of expressing deviations from normal in figures have developed, and the vague speculations have been replaced by definite and wide accepted facts. It is necessary now to use precise terms in order to avoid vagueness. The significance of the terms in common use is explained below.

Dissociation; Meaning of cH and pH.

When dissolved in water strong acids, like most salts, dissociate completely or almost completely into ions—e.g., $HCl \rightarrow H^+ + Cl^-$. The kations (marked with a + sign) carry positive electrical charges and differ from the corresponding atoms by having given up one or more (depending on the valency) electrones, while the anions (carrying a − sign) carry negative charges and have gained one or more electrons. Weak acids, however, dissociate only partially, for example, acetic acid

$$CH_3.COOH \rightleftarrows H^+ + CH_3COO^-$$

The weaker an acid the less its dissociation into ions, and at the limit we have water which dissociates very slightly, as $H_2O \rightleftarrows H^+ + OH^-$. Similarly bases dissociate to a degree depending on their strength—e.g., $NaOH \rightarrow Na^+ + OH^-$. The dissociation of weak acid is a reversible reaction; if the concentration of the hydrogen-ion or of the anion is increased the reaction shifts in the direction of the undissociated molecule. It is the presence of hydrogen ions in all watery solutions and the part they play in such reversible reactions that make hydrogen-ion concentrations of great importance in biochemistry.

The *hydrogen-ion concentration* (represented by the symbol cH) is expressed quite simply by the number of grammes of hydrogen present in the ionic form per litre; thus in N/100 hydrochloric acid, with 1/100 gramme of hydrogen ion per litre cH 1/100; while in N/100 acetic acid, in which only 1/78 of the acid present is dissociated, there is only 1/7800 gramme of hydrogen ion per litre (cH = 1/7800). In pure water, at 38° C., cH = 1/5,000,000.

When the hydrogen-ion concentration of a solution is the same as that of water the solution is said to be neutral; a solution with a cH greater than this is acid and one with a lower cH is alkaline. In biochemistry and medicine we have to deal with fluids with a cH near that of pure water, and to avoid cumbrous figures another method of representing hydrogen-ion concentration—pH—is used; pH = log 1/cH, or if $cH = 1/10^x$, pH = x. *Table II.* shows the pH corresponding to the cH of various fluids. When the cH increases (that is, when the solution becomes more acid) the pH decreases, and vice versa; increasing the pH of a solution by 1·0 is equivalent to dividing the cH by 10; increasing pH by 0·30 is equivalent to multiplying the cH by 2.

It is probable that the disadvantages of the general use of the expression pH outweigh the advantages, but its use is now firmly established.

Buffers.

As the range of hydrogen-ion concentration compatible with life is a narrow one, it is necessary to

[1] The diagnosis of acidosis, alkalosis, and ketosis will be discussed next week.

prevent great variation. This is done by removing excess of acid or base, but during the process, or if the removal is not complete, the effect of such excess is mitigated by the buffer systems of the body. These buffer systems consist of mixtures of weak acids with their corresponding salts; although such a mixture contains free acid its hydrogen-ion concentration may be low, since the dissociation of the free acid is very slight in the presence of its fully dissociated salts—it is given by the equation

$$cH = K\frac{c(HA)}{c(NaA)}$$

where c(HA) is the concentration of free weak acid, HA c(NaA) the concentration of its salts, and K a constant for this acid (the dissociation constant). For convenience this equation will be quoted below as equation (1).

If a strong acid like HCl is added to such a mixture it combines with the base of the NaA forming NaCl, and setting free HA, which is very little dissociated, so that only a slight rise of hydrogen-ion concentration takes place. Similarly if a strong base like NaOH is added it combines with some of the free acid and the cH is but little reduced.

The chief buffers in the body are carbonic acid, H_2CO_3, and its salts, the bicarbonates, chiefly $NaHCO_3$, and proteins, which behave as weak acids at the reaction of the body and form salts. When CO_2 is retained in the body the concentration of H_2CO_3 in the body fluids is increased; part of this H_2CO_3 combines with the base of protein salts, setting free protein in the acid form (which is but slightly dissociated) and part remains as free H_2CO_3, which, however, is very slightly dissociated in the presence of its salts. Using equation (1) in its most familiar form (the Henderson-Hasselbalch equation), which we may call equation (2),

$$= K_{H_2CO_3}\frac{c(H_2CO_3)}{c(NaHCO_3)}$$

we can calculate the increase in cH produced by a given increase of H_2CO_3. The amount of CO_2 formed by a resting man in one minute (about 0·33 g.) would raise the cH of 50 litres (about the volume of fluid in the body) of distilled water to 1/40,000 (pH = 4·6); but would only change 50 litres of a solution of H_2CO_3 and $NaHCO_3$ such as is found in normal plasma, from cH = 1/25,000,000 (pH = 7·40) to cH = 1/23,000,000 (pH = 7·36), or 50 litres of blood, which is better buffered owing to the presence of proteins, from pH 7·400 to pH 7·397.

If an acid such as HCl is added to blood the larger part combines with the base of the protein salts, setting free protein acid, and some with the base of bicarbonates, setting free H_2CO_3. The chief buffers of blood in this way are thus the proteins, especially hæmoglobin, but because the free H_2CO_3 and bicarbonate can be estimated attention is mainly fixed on these two. Similarly excess of base combines with acid protein, and with free H_2CO_3.

Since equation (1) applies to proteins (P), we can write it also as equation (3),

$$= K_P\frac{c(HP)}{c(NaP)}$$

and see that the ratio of protein present in acid form to that present as salt varies with the hydrogen-ion concentration. Herein lies one reason for the importance of changes of cH to living organisms; the chemical state of one of their essential constituents changes proportionally to changes of cH.

Removal of Acid.

One of the chief factors controlling respiration is the cH of the blood. When this is raised or lowered the respiratory exchange is increased or decreased. Respiration thus not only removes excess CO_2 but also compensates for the effects of retention of bases or other acids. When an acid such as HCl has been retained in the body, combining with some of the bicarbonate, so that $c(NaHCO_3)$ in equation (2) is reduced and cH increased, increased respiration takes place washing out CO_2 until $c(H_2CO_3)$ is so reduced that the ratio

$$\frac{c(H_2CO_3)}{c(NaHCO_3)}$$

and hence cH are again normal. When this has occurred the ratio of protein acid to protein salt equation (3) must again be normal and, since the total amount of protein cannot have been reduced, c(NaPr) must be restored to normal and all the retained acid must have combined with $NaHCO_3$. When a retention of acid is thus "compensated" by washing out CO_2, the retained acid has taken base only at the expense of the bicarbonates, and its concentration can be estimated by the amount that the bicarbonates are reduced. The base combined as bicarbonates in the body fluid thus acts as a reserve which can be used up to neutralise retained acids, without change in the cH or utilisation of base combined with the other acids of the body fluids; it is therefore spoken of as the "*alkali reserve.*" When excess of base is present in the blood, $c(NaHCO_3)$ in equation (2) is raised, the cH consequently lowered, and respiration depressed.

Most organic acids are oxidised into CO_2 and water; this oxidation is so rapid that acids such as citric and tartaric when taken by the mouth cause no disturbance of the acid-base balance. Mineral acids and bases, and organic acids and bases that have escaped oxidation or other metabolic change, are removed by the kidneys. But the kidneys do not merely remove surplus amounts of any particular acid or base but also "compensate" for variations of $c(H_2CO_3)$ by excreting an acid urine, when owing to retention of CO_2 the cH of the plasma is too high; thereby they reduce the amount of fixed acid in the body fluids, and raise the amount of base available to form bicarbonates, so that $c(NaHCO_3)$ tends to be raised and the ratio

$$\frac{c(H_2CO_3)}{c(NaHCO_3)}$$

and consequently the cH tend to return to normal. Similarly when $c(H_2CO_3)$ is reduced by overbreathing, alkaline urine is passed with a consequent tendency to a compensatory fall of $c(NaHCO_3)$.

When an acid urine is passed a considerable part of the acid is neutralised by ammonia formed in the kidney, but ammonia plays no part in neutralising acids in the blood and tissues.

Disturbance of Acid-base Balance.

In disturbances of the balance of acids and bases there may be little or no disturbance of cH, nor of the buffers other than the carbonic acid-bicarbonate system, owing to the success of compensation; but there must always be a change of concentration of free carbonic acid or bicarbonate or both. The concentration of these two substances in the blood or plasma are therefore used as indices of disturbance of the balance. The concentrations of free carbonic acid and of bicarbonates are usually expressed as the number of cubic centimetres of CO_2 gas in these two forms per 100 c.cm. Thus 100 c.cm. normal plasma contains 55 to 65 c.cm. and 100 c.cm. of normal blood, 46 to 54 c.cm. of CO_2 combined as bicarbonate, and about 1/20th of these amounts of CO_2 as free carbonic acid.

Disturbances of acid-base regulation are most conveniently classed in two groups: (1) those that primarily cause changes in the concentration of free H_2CO_3; and (2) those that primarily change the concentration of bicarbonate.

If the word "acidosis" is to have any definite meaning it should be used for type 2 (*a*) in Table I.; type 2 (*b*) may be called alkalosis. Excretion of acetone bodies in the urine is best called ketosis, thereby avoiding confusion with other conditions in which the plasma bicarbonate may be reduced, and recognising the fact that a disturbance of the acid base balance does not necessarily accompany the excretion of acetone bodies in the urine. The terms acidæmia and alkalæmia have been proposed for increase and decrease of the cH of the blood.

In type 1 (*a*) interference with respiration owing to failure of the heart to pump blood through the lungs sufficiently rapidly or to disease of the lung would seem a likely cause of CO_2 retention, but actually, since it is much more difficult to get oxygen in than to get CO_2 out, the CO_2 is usually kept down to normal levels in the efforts to take in sufficient oxygen.

TABLE I.—*Types of Disturbance of Acid-base Balance.*

1. *Affecting* $c(H_2CO_3)$.	2. *Affecting* $c(NaHCO_3)$.
(*a*) *Increase.*—Increased formation—violent exercise. Impaired elimination. Depression of respiratory centre by narcotics, and sleep. Interference with respiration (disease of heart or lungs). Breathing CO_2.	(*a*) *Increase.*—Excessive ingestion of acids, or potential acids (NH_4Cl or $CaCl_2$). Excessive formation of acids—lactic acid in exercise. Failure of oxidation of acids—especially acetoacetic acid. Failure of excretion of acids in nephritis. Loss of base.
(*b*) *Decrease.*—Overbreathing—voluntary, in hysteria, emotional, as a result of peripheral stimuli, in fevers, at high altitudes, in renal asthma.	(*b*) *Increase.*—Excessive ingestion of bases ($NaHCO_3$) or potential bases (e.g., sodium citrate). Loss of acid.

In the same way in type 1 (*b*), when the atmospheric oxygen pressure is reduced at high altitudes, the excessive breathing required to take in sufficient oxygen reduces the H_2CO_3 in the blood below normal so that at 15,000 feet the pH may rise to 7·5 or 7·6. The kidneys can remove moderate amounts of acid or base as fast as they are formed or ingested; it is only when the amounts are excessive or the kidneys damaged that appreciable acidosis or alkalosis occurs. Thus a patient may pass considerable amounts of acetone bodies in the urine without any reduction of both $c(H_2CO_3)$ and $c(NaHCO_3)$ are reduced, and it may be difficult to decide which was the primary change. However, as a rule, the compensation is not complete—that is, the cH is not brought completely back to normal, so that measurement of cH settles the question; in many cases also the history excludes any doubt.

Effects of Disturbance.

Disturbances of the acid-base balance produce general effects only in so far as the cH of the body fluids is altered. Within limits increase of cH has little effect beyond causing hyperpnœa. The acidosis produced by NH_4Cl and $CaCl_2$ is followed by a profuse diuresis, and has been used for treating œdema in nephritis; also increase of cH appears to reduce the irritability of the neuromuscular junctions and NH_4Cl acidosis has been used for the treatment of tetany in children due to low plasma calcium. The bad effects of severe NH_4Cl acidosis found by J. B. S. Haldane in experiments on himself were probably due to an extremely severe local acidosis in the liver, where neutral NH_4Cl was converted into an acid mixture of urea and hydrochloric acid; such an intense local production of strong acid does not occur in any natural acidosis. It is significant that violent exercise normally produces an acidosis with great increase of cH, since owing to the increased production of CO_2 at the same time it is impossible to compensate for reduction of $NaHCO_3$. The acidæmia at the end of a quarter-mile race must exceed anything seen in pathological conditions except just before death. Neither uræmia, nor the

TABLE II.—*Examples of Disturbance of Acid-base Balance.*

Type.	—	pH.	cH.	Bicarbonate c.cm. of CO_2 per 100 c.cm.		Free H_2CO_3 c.cm. of CO_2 per 100 c.cm. plasma.	—
				Plasma.	Blood.		
—	Norma.	7·30 to 7·45	$\frac{1}{20{,}000{,}000}$ to $\frac{1}{28{,}000{,}000}$	55–65	46–54	2·5 to 4·0	—
1 (*a*)	CO_2 Breathing.	7·10	$\frac{1}{12{,}500{,}000}$	65	54	6·5	Primary increase of $c(H_2CO_3)$.
1 (*b*)	Voluntary hyperpnœa.	7·60	$\frac{1}{40{,}000{,}000}$	50	43	1·6	Primary decrease of $c(H_2CO_3)$. Some compensatory reduction of $c(NaHCO_3)$. Tetany.
	High altitude. Compensated.	7·40	$\frac{1}{25{,}000{,}000}$	40	34	2·0	Primary decrease of $c(H_2CO_3)$. Compensatory reduction of $c(NaHCO_3)$ by excretion of base in urine.
2 (*a*)	Ketosis (starvation). Moderate acidosis. Compensated.	7·40	$\frac{1}{25{,}000{,}000}$	45	38	2·2	Primary reduction of $c(NaHCO_3)$ by retained acetone bodies. Compensatory reduction of $c(H_2CO_3)$.
	Exertion. Medium acidosis. Uncompensated.	7·15	$\frac{1}{14{,}000{,}000}$	38	32	3·4	Primary reduction of $c(NaHCO_3)$ by lactic acid.
	Nephritis. Severe acidosis. Uncompensated.	7·10	$\frac{1}{12{,}500{,}000}$	15	13	1·5	Primary reduction of $c(NaHCO_3)$ by retained H_3PO_4 and H_2SO_4. Some compensatory reduction of $c(H_2CO_3)$. No signs of uræmia. Blood-urea 0·32 per cent.
2 (*b*)	Dosage with $NaHCO_3$. Mild alkalosis. Compensated.	7·43	$\frac{1}{27{,}000{,}000}$	78	65	3·6	Primary increase of $c(NaHCO_3)$. Rather high $c(H_2CO_3)$.
	Pyloric obstruction. Severe alkalosis. Uncompensated.	7·60	$\frac{1}{40{,}000{,}000}$	119	99	3·8	Primary increase of $c(NaHCO_3)$ owing to loss of HCl by vomiting. Collapse, cyanosis, feeble breathing, tetany.

$c(NaHCO_3)$ or increase of cH, and large doses of aklalis such as grs. 300 of sodium bicarbonate may be taken daily without an increase in $c(NaHCO_3)$.

Compensation.

In all these conditions attempts at compensation take place; in particular, in type 1 (*a*) alkali is excreted in the urine so that $c(NaHCO_3)$ is reduced, while in 2 (*a*) CO_2 is washed out by increased respiration and $c(H_2CO_3)$ is reduced. Thus in both types symptoms of diabetic coma (other than hyperpnœa) are due to acidosis, per se, nor are they improved by alkalis. There is therefore no evidence that acidosis is the cause of any disease.

The conditions in types 1 (*b*) and 2 (*b*), in which the change is towards the alkaline side, are more serious. In the first place compensation presents difficulties; compensation for reduced $c(H_2CO_3)$ is slow, so that accommodation to high altitudes takes some weeks, and compensation for increased

c($NaHCO_3$) involves reduced respiration with consequent reduction of oxygen intake.

When uncompensated, both these conditions lead to a reduction of cH, which is accompanied by interference with the oxygen supply to the tissues and various nervous manifestations. When the cH is reduced hæmoglobin gives up oxygen to the tissues less readily, so that the body may be starved of oxygen although the blood is well oxygenated; and with reduction of cH the neuro-muscular junctions are more irritable, so that tetany or even general convulsions may develop. A mild ketosis is frequently found in conditions in which the blood cH is decreased.

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Special Articles.

ON THE VISCERAL LESIONS THAT MAY ACCOMPANY EXPERIMENTAL VACCINIA IN RABBITS.

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IT is the purpose of this communication to place on record certain observations on a subject to which attention has been drawn by Douglas, Smith, and Price (1929) in a recent important paper.

That the virus of vaccinia is capable of invading the system from a skin area in which it has been inseminated and may be recovered from the blood and organs, though at times with considerable difficulty and by the aid of special methods, is now fully recognised. It was largely the work of Ohtawará (1921) based on the intratesticular method of virus-propagation devised by Noguchi (1915) that paved the way for demonstrating experimentally this capacity of virus to invade. The new knowledge accorded well with what we have long known of the symptomatology of localised vaccinia, both in man and animals, as a febrile disease accompanied, it may be, by at least one clinically demonstrable visceral disturbance—viz., acute splenomegaly. So long as the ordinary cutaneous strains of lymph continued to be used for the study of experimental vaccinia in rabbits, there was no good evidence that such virus, though capable of invading, had also the power to produce discrete naked-eye lesions in viscera after simple cutaneous insemination. The early work of Calmette and Guérin (1901) showed, indeed, that after intravenous introduction of such virus, vaccinial lesions were liable to appear on shaved areas of skin. In eliciting even this simple and striking phenomenon, however, subsequent observers have not been invariably successful and, doubtless, the reason for the failure has to be sought in the employment of inadequate doses of virus. It was, in fact, the comprehensive and minutely documented work of Camus (1917–18) which demonstrated clearly and for the first time that vaccine virus of cutaneous source was capable, when adminstered intravenously and in adequate dose, of producing characteristic vesicles and papules about the mouth, lips, nose, tongue, buccal cavity, eyelids, palpebral conjunctivæ, and genital orifices of experimental animals.

The work of Camus, comprehensive and detailed as it was, does not appear to have received the attention it undoubtedly merits as a fundamental contribution to this subject. Camus describes and figures the lesions of generalised vaccinia not only in rabbits, but also in guinea-pigs, dogs, cats, bovines, and monkeys. These lesions were invariably produced provided an adequate dose of a "purified" virus was inoculated into their veins. Adequacy of dose was of prime importance. While the generalised lesions in rabbit and guinea-pig were largely confined to the sites mentioned, and were only occasionally noted in the unshaved skin, in the dog and cat cutaneous lesions were the rule. It does not appear that Camus noted any visceral lesions, regarded by him as vaccinial, in those rabbits which died either owing to the intensity of the eruption itself or from secondary bacterial infections. It is, however, of very considerable interest in the light of more recent work that some of Camus's animals, which died later in a cachectic state, showed white spots in liver and spleen which Camus interpreted as evidence of secondary bacterial infection. He records, indeed, the cultivation of staphylococci from such spots. Congestion of the ovaries was noted by him, but he makes no mention of renal or pulmonary lesions.

The results of Camus's work, in so far as they concern the production of lesions in the neighbourhood of mucous orifices, have been fully confirmed (Uhlenhuth and Bieber, 1923; Watanabe, 1924, &c.).

Levaditi and Nicolau (1923) in their study of neurovaccine saw similar lesions to those described by Camus after intravenous injection of the virus, Their work was, in the main, directed to the recovery. of virus from various organs with a view to securing evidence of affinity of virus to tissues of epiblastic origin, and in the course of this work they demonstrated the fairly constant presence of virus in adrenals, lung, &c. No naked-eye lesions in liver, lung, or adrenal were noted by them, but they describe and illustrate what they take to be microscopic inflammatory foci of vaccinial origin in lung, liver, and interstitial tissue of the ovary. Watanabe (1924). using glycerinated lymph and the intravenous method, demonstrated in rabbits the production of vaccine pustules about the face, as Camus had done, but his results are of special interest in that he noted the presence on the hairy skin of numerous small papules with hæmorrhagic centres. Histological examination of these papules revealed inflammatory reactions in the dermis only. Epithelium was not involved. These papules he believed to be caused by the virus. They did not appear when the virus was inoculated intravenously into immune rabbits. One of us (Ledingham, 1924) in the course of an investigation of the tissue affinity of vaccinia, inoculated the virus directly into the spleen. A specific lesion was produced locally, and a crop of secondary vaccine papules which were described and figured appeared on the serosa of adjacent coils of bowel. Similarly, when introduced into the peritoneum the virus gave rise to omental papules of like histological structure. It appeared, therefore, that vaccine virus of cutaneous origin had the capacity, if a somewhat feeble one, to produce lesions in abdominal viscera when directly introduced.

Our knowledge, however, of the generalising potentialities of the vaccine virus has been considerably increased by the experimental results recorded by Douglas, Smith, and Price (1929) working with potent doses of neurovaccine or neuro-testicular vaccine introduced by various routes. In addition to lesions about the mouth, nose, and eyes corresponding to the picture of Camus, and which were frequently accompanied by acute catarrhal processes, they describe and illustrate multiple lesions in the hairy skin and macroscopic foci in lungs, liver, adrenals, testicles, ovaries, mammary glands, spleen, and intestinal serosa. Though elicited with greatest constancy and intensity by the intravenous route, these visceral lesions were liable on occasion to follow intracutaneous, intracerebral, and intraperitoneal inoculations of neurovaccine. Douglas and his colleagues give no histological details of these visceral lesions. They state, however, that bacteriological examinations of various tissue lesions and fluids gave consistently negative

results and that, therefore, secondary bacterial infections might definitely be excluded from playing a part in the genesis of the lesions. McIntosh and Scarff (1929), who have encountered similar lesions by similar methods, also state that there was no evidence in their rabbits of the presence of secondary infections such as—e.g., pasteurella.

Some months before the paper by Douglas, Smith, and Price appeared, one of us (L.) who had had the advantage, through the kindness of Capt. Douglas of seeing these visceral lesions in the rabbit, and of studying the histology of casual specimens, commenced experiments with neurotesticular vaccine in order to secure some personal experience with this potent type of strain. It was soon noted that certain animals after intravenous inoculation developed acute catarrhal eye conditions, while other animals inoculated intradermally with the same virus presented characteristic lesions on adjacent areas of shaved skin. At later stages these animals also were liable to develop acute catarrh about the eye and nose. If such animals died or were sacrificed the remarkable picture described by Douglas, Smith, and Price was generally in evidence either in full or modified form. A very notable feature of this picture was the massive involvement of the uterine horns in pregnant females which at one time led to abortion and at another to death in loco of the fœtuses. The latter picture was especially noted at autopsies performed some two to three weeks after intracutaneous titration of neurotesticular vaccine on the shaved backs.

The successful cultivation of *P. lepiseptica* from the eye discharge in some of these cases, and from similar discharges in uninoculated stock rabbits during the winter months led one of us (L.) to put forward the suggestion, in the course of recent discussions on viruses, that in the genesis of these remarkable lesions latent bacterial infections stimulated to activity by the introduction of a potent vaccine virus, might play a part, and that the vaccine virus might not be solely responsible. Histological examination of visceral lesions and of tissues kindly lent by Capt. Douglas had revealed the presence of massive cell necroses (chromatin comminution) with little or no evidence of repair, and it became, therefore, a question how far it was possible to distinguish casual lesions of this character from those due—for example, to pasteurella organisms which are known to produce necrotic lesions in lungs and liver. Moreover, the not infrequent occurrence in uninoculated rabbits or rabbits inoculated with materials other than vaccinia, of casual discrete pearly spots in lungs and livers, required careful consideration in correctly appraising the visceral lesions following inoculation with neurovaccine. Such spots are often bacteriologically sterile, but they may, nevertheless, represent healed or healing granulomatous lesions due primarily to bacteria. Histological examination has shown that slight coccidial liver infections may, on occasion, take the form of quite small pearly foci liable to be confused with the miliary pearls described in the liver following the introduction of neurovaccine. These difficulties are illustrated below in discussing the histological features of the visceral lesions, and the point emerges clearly that the examination of successive stages in the evolution of the lesions can alone give confidence in interpretation.

The suggestion that organisms of the pasteurella group might possibly play a part was also strengthened by the experimental data of Pette (1928) who, in the course of an attempt to repeat the work of Lucksch, had the unusual experience of seeing rabbits, scarified or otherwise inoculated with lymph, die of acute pasteurellar infection. Examination of the nasal mucosæ of clinically healthy stock rabbits revealed pasteurellar infection in 10 per cent. of the animals.

Record of Authors' Experiments.

We propose here to place on record a brief series of experiments designed to determine whether such suggestion as to the origin of the visceral lesions was valid, and if so, to what extent; and, secondly, to give some details of the histology of these visceral lesions which are new to pathology. It may be said at once that the above-cited suggestion, based on the initial experiences, has received only a modified support from further work, and that the capacity of vaccine virus under appropriate conditions to produce widespread visceral lesions in rabbits must be frankly admitted.

The present bacteriological and histological study is based on two main sources of material:—

Source A.—Eight rabbits were inoculated intradermally in numerous spots over the shaved back in the course of titration of neurovaccine or of similar virus grown in contact with living cells. For this material we are indebted to Drs. Eagles and McClean. The following brief particulars are appended with regard to these eight animals:—

R.65: Conjunctivitis noted fifteenth day. Killed sixteenth day. Scattered foci in liver. *R.69*: Intradermal reactions feeble, but generalisation on skin noted seventh day, and conjunctivitis on twentieth day. Killed twenty-first day. Lesions in liver, lungs, and uterine horns. *R.70*: Intradermal reactions feeble. Conjunctivitis noted tenth day. Killed twenty-first day. Foci in ovary, uterus, liver, and lungs. *R.76*: Intradermal reactions feeble. No conjunctivitis. Dead on twentieth day. Pregnant, multiple lesions in uterus, ovary, kidney, and liver. *R.81*: Intradermal reactions strong. Skin generalisation. Dead on twenty-fifth day. Pregnant, massive necrotic lesions in uterus and multiple foci in lungs. *R.85*: Intradermal reactions strong. Emaciation ensued. Killed sixth day. Not pregnant. Numerous foci in spleen, liver, lungs, and adrenals, and a few in uterine horns. *R.73*: Intradermal reactions feeble. No generalisation. No conjunctivitis. Died after 60 days. Some white spots on liver and uterus *R.93*: Intradermal reactions normal. On this occasion pure dermal virus used. Killed on fourth day to secure passage material. Liver showed many pearly foci.

Source B.—Sixteen animals were inoculated intravenously or intradermally and intravenously with neurotesticular vaccine. Of these 16 animals 12 belonged to one series, all of which received the same dose of neurovaccine intravenously on the same day—viz., 2 c.cm. of a 1 in 10 dilution of a strain of neurovaccine which was capable of producing dermal reactions in a dilution of 1 in 1,000,000.

The weights (in oz.) and temperatures of these 12 animals before and after inoculation on July 2nd are shown in the Table. (+ = death).

It will be noted that eight animals died between the sixth and twelfth day. Apart from the picture described by Camus (pocks about the lips, nose, and eyelids) particularly intense lesions appeared on the ear employed for intravenous injection. The ear either showed a diffuse board-like thickening or more commonly the substance of the ear was beset with hard shotty papules. In one case only were shotty nodes observed in the opposite ear. At the autopsies of the fatal cases the picture was substantially that described by Douglas, Smith, and Price, but varied slightly in intensity in individual cases. Five of the animals had pocks about the mouth, tongue, nose, and eyes, but in two only was there an acute purulent discharge with keratitis. Slight mucoid discharges at the canthi were usually associated with the presence of a pock on the eyelid. In four of the fatal cases the skin of the back and the underlying fasciæ were beset with purpuric spots often confluent, the picture recalling strongly that met with in the skin of rabbits inoculated with an antiplatelet serum. The purpura was associated with considerable œdema of the dermal tissues, and the lymph glands of axilla and groin were of the red hæmolymph type. In these essentially hæmorrhagic cases lungs and other organs were beset with petechiæ. The bladder usually contained blood-stained urine, and in one case a large fresh blood-clot almost filled the vesical cavity. It should be noted also that the purpuric areas in the skin of the back contained no formed papules, death having taken place too early for these to develop.

Bacteriological Investigations.

During the months November, 1928, to April, 1929, when acute catarrh of eye and nose was liable to intervene at some period following intradermal or intravenous inoculation with neurotesticular vaccine bacteriological examination of these catarrhal discharges and of organs in which lesions were detected when the animal was sacrificed or succumbed were carried out by one of us (B.). It is unnecessary here to record the findings in detail, as in a few cases only were results of definite significance obtained. From the eye discharges of three of the earlier cases of the winter series, organisms corresponding in cultural and

biochemical characters with *P. lepiseptica* were recovered, while from five cases pasteurella-like organisms more closely resembling *Bacillus bronchisepticus* were obtained. From the nasal discharges of four cases *P. lepiseptica* was recovered in one case and from another a pasteurella-like organism. Representatives of this group were naturally searched for with special care in view of their association with snuffles in rabbits and their possible "activation" from latency by the inoculation of a potent virus. No evidence, however, was obtained of the presence of organisms of this group in organs showing lesions. When such organisms were present in an eye discharge but absent from an organ lesion it was not possible to exclude definitely participation of pasteurella if the lesion happened to be of some standing, as it is known that these organisms may be only with difficulty, if at all, recoverable from lesions in process of repair.

As we shall see later, the pearly lesions found in the livers of intradermally inoculated animals after a period of three weeks were usually of the granulomatous type. In no case was a blood invasion by *P. lepiseptica* demonstrated. On the other hand, in two cases in which cultivations were made from the as it recalled a former case in the experience of one of us in which a rabbit inoculated with calf lymph intradermally was found dead on the fourth day. From all its organs *B. anthracis* was recovered. No work on anthrax was in progress at the time.

Finally, with regard to the eight fatal cases of the tabulated series, in one case only (No. 14) was evidence obtained of a secondary streptococcal invasion. Heart bloods post mortem were usually sterile. From spleens, livers, and lungs only occasional contaminants, mainly of coliform or gelatin-liquefying types, were recovered. The freedom from secondary bacterial invasions exhibited by these early fatal cases gave the necessary confidence in interpreting the histological features of the visceral lesions. To this subject we now come.

Histology of the Visceral Lesions.

The histological features of visceral lesions following the introduction of neurotesticular vaccine by intravenous and intradermal routes have been studied so far in 22 rabbits—viz., (A) 8 fatal cases at six to twelve days after intravenous inoculation (see Table); (B) 4 rabbits similarly inoculated, but sacrificed between the sixth and sixteenth day; (C) 3

TABLE SHOWING COURSE OF TEMPERATURE AND WEIGHT AFTER INTRAVENOUS INOCULATION ON JULY 2ND. (12 RABBITS.)

No.	July 2nd		3rd		4th		5th		6th		7th		8th		9th		10th		11th	
	T.	Wt.	T.	Wt.	T.	Wt.	T.	Wt.	T.	Wt.	T.	Wt.	T.	Wt.	T.	Wt.	T.	Wt.	T.	Wt.
9	103·4	54	102·6	54¾	105·6	55	104·8	56	105·8	—	103·4	—	<97	49	+		—	—	—	—
10	102·2	46	102	47	104·6	47	105	48½	105·6	—	105	—	103	47	103	46	103	45	102·6	43
11	102	47	102·2	48½	104·8	?	105·4	49	105·2	—	104·8	—	104	50½	103·8	48	103·2	46	102·4	43½
12	102·4	49	101·8	49	104	49	104·6	48	100	—	96	—	+		—	—	—	—	—	—
13	103	45	102·8	45¾	104·8	49	105	48	106	—	104·2	—	102·6	43½	95·6	42	+		—	—
14	102·6	49	103	50	105·8	47½	105·2	49¼	106·2	—	105	—	103·2	48	100·2	47½	97·8	44	+	
15	102·6	49	102·2	49	105	50½	105	48	103	—	100·4	—	95·4	41½	+		—	—	—	—
16	102	49	101·6	49½	105·6	49	105·2	48½	102·8	—	98·4	—	+		—	—	—	—	—	—
17	102	50½	102·2	51½	104·8	—	105	51	103·4	—	100·2	—	<97	46 +	—	—	—	—	—	—
18	102·2	50½	102·2	53½	105·4	53½	105·2	54¾	105·4	—	104·8	—	104·2	57¾	104·6	56½	103·6	55	103	56
19	102·2	49	102·6	48	105·6	47½	105·4	49	105·6	—	104·6	—	104	46	104	45	103·8	43	102·2	41½
20	103·2	50	102·4	51	105·2	54	105·4	54½	106	—	105·2	—	105	56	105·2	54½	104	52	103	50½

No.	July 12th		13th		14th		15th		16th		17th		18th		20th		21st		27th	
	T.	Wt.	T.	Wt.	T.	Wt.	T.	Wt.	T.	Wt.	T.	Wt.	T.	Wt.	T.	Wt.	T.	Wt.	T.	Wt.
10	101·2	40½	97·8	38	+		—	—	—	—	—	—	—	—	—	—	—	—	—	—
11	101·4	41½	100·2	41½	100·8	43½	100·8	44½	102·2	37	101·6	50½	100·8	52	101·2	49½	100·2	50½	—	45½
18	103	56½	102	55	102	56	102	58	102·6	60	102·8	59½	101·6	62½	101·2	55½	101·8	58	—	59
19	99·6	38	99·8	37¾	100·2	37½	100	37¾	99	37¾	98·8	41¾	99	41	101·6	39	100·6	40	—	44½
20	101·8	49½	100·2	50	99·6	52	100·2	56	101	58½	100·6	57¾	100·8	59	100·4	55	99·8	56½	—	61½

Weight in ounces. + = death.

intensely hæmorrhagic and œdematous dermal tissue characteristic of the dermal response to neurotesticular vaccine, and from adjacent generalised skin papules, an organism not yet identified, but culturally resembling *P. lepiseptica* was recovered in pure culture. While, therefore, in intradermally inoculated animals sacrificed about the third week no clear evidence of participation of bacterial infections in the visceral lesions was forthcoming, it was definitely established that secondary bacterial infections were a contributory cause of death when such animals succumbed as occasionally happened. In *R. 81* (see Source A) for example, which was found dead on the twenty-fifth day, all the organs examined contained pneumococci in pure culture, and sections revealed a massive invasion by these organisms. Doubtless the pregnant state coupled with the necroses of the uterine wall due to virus action predisposed to secondary bacterial invasion. In another instance evidence of bacterial invasion was obtained in a rabbit which was killed for histological study on the seventh day after intravenous inoculation of neurovaccine. Spleen films made immediately after sacrificing the animal revealed the presence of a Gram-positive rod, and a culture of an anthracoid organism was obtained, not only from the spleen but from uterus, liver, and lung. The colonies obtained were few in each case, and in all probability the organism was in process of dying out after a brief blood invasion. The circumstance is noted, however, rabbits, *R. 76*, *R. 81*, *R. 73*, intradermally inoculated and showing some evidence of generalisation at death on twentieth, twenty-fifth and sixtieth days; (D) 5 rabbits intradermally inoculated and sacrificed on fourth, sixth, sixteenth, twenty-first, and twenty-first days, *R. 93*, *R. 85*, *R. 65*, *R. 69*, *R. 70*; and (E) 2 rabbits sacrificed five months after an intravenous inoculation from which they did not appear to suffer. In addition, suspicious spots in organs of animals inoculated with various bacteria (pasteurella, anthracoid organisms, pneumococcus, &c.) have been examined for comparative purposes. It is proposed here to record the main features only, pending a fuller illustrated study to be published later.

Series A.—The most satisfactory material has been that obtained from the early fatal cases (see Table) in which there was no evidence that death was due to other causes than the virus. The four surviving animals of this series are being retained for study of possible late lesions.

Liver.—Multiple focal necroses of liver cells, showing, as a rule, evidence of initial hæmorrhage, is the prevailing lesion. These necroses are precisely similar to those met with in certain acute bacterial infections—e.g., spontaneous rat plague—and need no description. In those rabbits which died at the later periods (9–12 days) there was evidence of rapid replacement of necrotic areas by bile-duct proliferation.

Lung.—The feature here also is the presence of discrete or confluent areas of necroses of alveolar tissue accompanied by hæmorrhage. In the worst cases little healthy alveolar tissue may be left. Walls of blood-vessels and bronchi are

severely involved in the general necroses and there is little or no attempt at delimitation of the lesions by proliferation of adventitial cells of vascular sheaths. Where a hæmorrhagic necrotic focus is situated in the subpleural region, as frequently happens, a striking defence mechanism is afforded by the formation of a lens-shaped hyperplasia of the overlying serous endothelium. This structure is responsible for the raised macroscopic foci on the lung surface.

Ovary.—Lesions, when present, took the form of acute hæmorrhagic necroses, sometimes very extensive, in the interstitial tissue of the organ. There was no evidence of repair.

Spleen.—Isolated focal necroses in the pulp were noted in one case only.

Brain.—The animals had shown no symptoms pointing to cerebral disturbance during life. In three of the fatal cases, however, the brain was examined microscopically and showed no obvious lesions.

Adrenal.—In all the fatal cases of the series this organ presented focal necroses, discrete or confluent. As many as 25 discrete necroses have been counted in a cross section, so that the amount of functioning cortical tissue is greatly curtailed. The necroses are most commonly found in the mid cortex, but in two cases they have been noted in the medulla. The destruction of the adrenal cells is accompanied in the early stages by hæmorrhage, and considerable congestion of vessels is seen at the periphery of the lesion. In one case only (No. 10) which was the last to succumb (on the twelfth day) was there evidence of reaction on the part of the local reticulo-endothelial tissue. In this case the single large necrotic focus present was surrounded by a narrow zone of adventitial cells of plasmacytoid type.

Pocks on Skin of Back.—As noted above these lesions took the form of purpuric foci accompanied by œdema of the dermal tissue. Section of these areas showed massive necrosis with hæmorrhage of all vascular tissues in dermis down to the skin muscle, the bundles of which were also degenerate. There was no trace of repair.

Series B.—Of the four animals of this series (all older animals and weighing about 5 lb.) two were killed on the sixth and seventh days respectively, while apparently unaffected clinically by the intravenous dose, and the other two on the thirteenth and sixteenth days.

In one of the two former there were no necroses in liver, spleen, or adrenal, and only one fairly large focus in the lung section. Here, however, it was noted that the reticulo-endothelial tissue in the neighbourhood of the larger vessels and bronchi showed very marked proliferation, and that polynuclear cells were infiltrating the necrotic area. In the other animal the lungs contained numerous confluent necroses, but there was very definite reaction on the part of the vessel sheaths. These proliferated sheaths are striking objects in all vessels not completely necrosed. The liver also showed foci containing proliferated bile-duct epithelium, apparently replacing areas of initial necroses. Uterus and ovaries contained widespread hæmorrhagic necroses, but even at this early stage defence processes were in evidence. Ovarian and uterine necroses showed vast numbers of infiltrating polynuclears which were usually absent in the necroses of the early fatal cases, and there were numerous wandering macrophages with included polynuclears. Collections of the latter cells with their nuclei fused together in horseshoe form, and their granules massed in the centre simulated in a remarkable way the Langhans giant-cell. When the necroses underlay the serosa, the serosal endothelium was proliferated to form a dome of many layers.

The adrenal section presented four large necroses with many infiltrating polynuclears, but no ring of new reticulo-endothelial tissue. This case also was the only one of the series in which grey papules were present on the serosa of the *bowel wall*. The necrotic lesion here was confined to the serous coat and underlying tissue. The muscular coats were not penetrated. At the surface the serous endothelium showed great hyperplasia with many mitoses.

Of the two killed on the thirteenth and sixteenth days, one only presented both in lung and adrenal isolated necroses surrounded by proliferated adventitial and plasmacytoid cells.

Series C and D (with exception of *R. 85* and *R. 93*).—The lesions met with in these animals, particularly those affecting the liver, were at times difficult to interpret.

Only *R. 70* and *R. 81* presented necroses in the lungs. In *R. 70*, which was killed on the twenty-first day, the single large necrosis noted in the lung section was surrounded by proliferated reticulo-endothelial tissue, and there was evidence of formation of new alveolar columns. In *R. 81*, which succumbed to a pneumococcus infection, the lung showed many necroses and many polynuclears infiltrating the lung substance, but no reticulo-endothelial response.

In *R. 70*, *R. 81*, and *R. 73*, the adrenals presented necroses, usually single, and surrounded by massive development of reticulo-endothelial cells.

R. 76, *R. 70*, and *R. 81* presented massive necroses in the walls of uterine horns extending to the mucosa, but there was already an attempt to delimit these areas by new reticulo-endothelial tissue. The small spot on the uterus of *R. 73* proved to be a granulomatous nodule of undetermined nature, attached to the serosa.

The scattered pearly spots observed on and in the livers of certain animals of this series and which, to the naked eye, corresponded tolerably well with those in the acute fatal cases, though fewer in number and of somewhat larger size, proved on section to be granulomatous areas with dense fibrous walls infiltrated with eosinophil cells. Occasionally enormous syncytial giant cells with many nuclei were present, and not infrequently a necrotic mass was present in the centre of the granuloma. We have come to the conclusion that all these spots represent some phase or other of the strange granulomatous foci known to be associated with coccidiosis, and that they have no relation to any antecedent vaccinial infection.

There is collateral evidence in support of this view. *R. 85*, which was killed on the sixth day after intradermal inoculation, presented similar granulomata in the liver with walls infiltrated by eosins. The adrenal section showed five necrotic foci round one of which there was already a new ring of reticulo-endothelial tissue. This case is of interest in that it demonstrates visceral generalisation so early as the sixth day after intradermal inoculation. Also in No. 16 (see Table), in addition to the multiple acute necroses in the liver, there were older areas containing *Eimeria stiedæ*.

The spots on the liver of *R. 93*, killed four days after inoculation intradermally with pure dermal virus, which is not known in our experience to have the property of generalising, were examined and found to consist of granulomatous masses containing remarkable giant-cell formations. Interlobular cirrhosis was present in the liver of this animal and in the livers of certain other animals of this series.

Finally, with regard to the two animals of *Series E*, which were sacrificed 143 and 165 days after an intravenous injection of neurotesticular vaccine, one of them showed an adrenal necrotic focus with massive development of new reticulo-endothelial tissue at its periphery. The giant-cell granulomata found in its liver were probably of coccidial origin. The other animal presented no lesions in liver or adrenal, but in the lung there were areas of massive perivascular infiltration containing occasionally giant cells of the fused nuclear type. No remains of initial necroses were seen, but the distribution of these areas might reasonably suggest a late stage in the healing of initial necroses. They appear to be identical with those figured by McIntosh and Scarff (1929) in a recent paper.

To conclude this section, it may be noted that spots simulating (to the naked eye) those met with in *Series C* and *D* have been found in the livers of animals inoculated with various bacteria. They cannot, however, be attributed to these experimental infections. For example, in animals inoculated intravenously with large doses of *P. lepiseptica* granulomatous areas have been present in the livers alongside the characteristic focal necroses due to the bacterial infection.

Discussion.

The observations we have recorded in this communication are in substantial agreement with those of Douglas, Smith, and Price, of McIntosh and Scarff (1929), and of Bijl and Frenkel (1929), whose paper dealing with the histology of visceral lesions following cutaneous vaccination of rabbits with neurovaccine appeared while these notes were being written. The suggestion for which one of us (L.) was responsible, that pasteurellar or other latent infection in rabbits might become active in response to the virus invasion and account for the lung and liver lesions has not been supported by the data here adduced. It is clear that the vaccine virus in the form of neurovaccine or neurotesticular vaccine is capable, in whatever site

introduced, of doing what cutaneous strains of virus are capable of doing only when introduced into the blood stream (picture of Camus). The "organ" virus has the further property of producing macroscopic lesions in many viscera.

It is remarkable that our present knowledge of the generalising properties of vaccinia has been reached so gradually. Camus attributed his successful results with cutaneous vaccine intravenously introduced to adequate dosage, and this factor is also of importance with neurovaccine. Young animals also would appear to be more responsive, as Douglas, Smith, and Price assert. Consideration of the histological features of lesions following neurovaccine does not suggest that the virus by passage through testis or brain or both has acquired new properties, but rather that it has become possessed in intensified form of properties shared also in a limited degree by strains of cutaneous source. The latter, when introduced into the dermis, will invariably produce some degree of necrotising action on vascular endothelium and reticulo-endothelial tissues generally, with consequent hæmorrhage. Introduction of neurovaccine into the dermis is followed on the other hand by widespread destruction of vascular tissue and widespread hæmorrhage. The diffusive uncircumscribed character of the skin reaction following intradermal inoculation of neurovaccine, with its peculiar purplish-black tint, is due to this, as histological examination shows. Increased endotheliotoxic or endotheliolytic powers, therefore, must increase not only the chance of invasion from a skin area, but also the strength of that invasion, and it is on the latter presumably that the production of actual visceral lesions will depend.

Reynals (1928) has shown that the addition of certain tissue extracts—(e.g., renal or testicular) to cutaneous strains of virus will very markedly enhance the dermal response following intradermal inoculation, thus rendering it very similar to that produced by neurovaccine. As neurotesticular vaccine can produce its characteristic skin reaction when employed in very high dilution, the "Reynals" factor is likely to account, only in a minor degree, for the enhanced virulence exhibited by strains which have been repeatedly passed through organs. That by repeated passage through a particular tissue a virus may acquire an increased power of proliferation in that tissue, and at the same time lose much of its power of propagation on the tissue on which it was originally propagated (scarified skin surface) has been shown by Ledingham and McClean (1928) in the case of virus propagated from dermis to dermis. This dermal virus, however, has never shown signs of generalisation either in skin or organs when implanted in a dermal area. Further research must elucidate the mechanism of these adaptations.

In the meantime it seems clear on general grounds that neurovaccine, while not apparently neurotropic, has nothing to recommend it as a form of vaccine lymph for human use. Bijl and Frenkel (loc. cit.) state that neurovaccine, which has been employed to some extent in Holland, involves a greater risk of postvaccinal encephalitis. So far, we have not seen the Dutch statistics on which this important assertion is based. It is freely stated, however, that the neurovaccine is liable to produce rather severe local reactions and to be followed not infrequently by generalised vaccinia. On the other hand, as Bijl and Frenkel remark, postvaccinal encephalitis is not known to be accompanied by generalised vaccinia in any form. Indeed, in the great majority of cases the vaccinations (with calf lymph) have run a normal course. There is the further fact that so far as our present knowledge goes, the brain is not involved in the generalised lesion syndrome (as distinct from simple virus invasion) following the introduction of neurovaccine in rabbits. Moreover, when neurovaccine is introduced directly into the brain of the rabbit, meningitis but not encephalitis is produced.

Huon and Placidi (1924) some years ago reported the occurrence of cerebral and paralytic symptoms in rabbits inoculated with a particular strain of lymph which had been propagated on asses. Death in coma was liable to occur on the fourth or fifth day, and vaccinal pustules were present on the tongue and buccal mucosa. A sample of this lymph, which had been kept in cold storage for some time, was kindly forwarded to one of us (L.) by M. Huon, of Marseilles, and tested on rabbits in London. The rabbits reacted normally to the virus, and there was no evidence whatever of cerebral disturbance.

Owing to its liability to spontaneous forms of encephalitis the rabbit has not proved a very suitable experimental animal for the investigation of problems concerned with the possible implication of the central nervous system in the syndrome that may follow the introduction into the skin of any form of vaccine virus. Though activation of latent bacterial infection has played no part in the production of the visceral lesions following introduction of neurovaccine, it is not to be assumed that such activation is a negligible contingency. The above-cited experience of Pette and many collateral data concerned with bacterial activations in the course of experimental avitaminoses show that the seasonal factor, as well as the degree of incidence of latent infection, are of importance. Moreover, there appears to be no doubt that for the occasional late deaths of rabbits following intradermal inoculation of neurovaccine secondary bacterial infections may be immediately responsible.

With regard, finally, to the visceral lesions and their histological features, perhaps the most interesting are those affecting the adrenals. For the early fatalities described in this paper the severe lung lesions and the widespread hæmorrhages were probably mainly responsible, but the equally severe necrotic lesions present in the adrenals suggest new clinical problems which it may be possible to attack experimentally. We have shown here that after five months such lesions may be demonstrable in process of repair. The experience of Douglas and his colleagues in connexion with pregnant female rabbits and the severity of the uterine lesions in such cases we fully confirm. As to the liver lesions, the vaccinial origin of the multiple focal necroses is not in dispute, but the greatest caution must be exercised in assigning a vaccinial origin to liver spots met with in animals sacrificed at later stages, though these may simulate in a remarkable way the naked-eye appearance of the acute necroses. It is probable that the true initial focal necroses in the rabbit liver become very rapidly replaced by new liver tissue in animals that are to survive.

Brief Summary.

(1) The observations of Douglas, Smith, and Price on the occurrence in rabbits of visceral lesions following the introduction of neurotesticular vaccine are confirmed. (2) These lesions are due to the virus and not to any latent bacterial infection activated by the virus. (3) Some account is given of the histological features of the visceral lesions, and attention is drawn to errors of interpretation that may arise in connexion with liver lesions of other than vaccinial origin. (4) Though not responsible for the visceral lesions, bacterial infections may intervene in the course of the cachexia produced by the virus, and may be responsible for a fatal issue. (5) The bearing of the new knowledge on some current problems is discussed.

References.

Bijl, J. P., and Frenkel, H. S.: Cent. f. Bakt. Orig. Abt. I., 1929, cxii., 412.
Calmette, A., and Guérin, C.: Ann. de l'Inst. Past., 1901, xv., 161.
Camus, L.: Jour. de Phys. et Path. gén., 1917–18, xvii., 244, 641.
Douglas, S. R., Smith, W., and Price, L. R. W.: Jour. Path. and Bact., 1929, xxxii., 99.
Huon and Placidi: Compt. rend. Soc. biol., 1924, xci., 308.
Ledingham, J. C. G.: Brit. Jour. Exp. Path., 1924, v., 332.
Ledingham, and McClean, D.: Ibid., 1928, ix., 216.
Levaditi, C., and Nicolau, S.: Ann. de l'Inst. Past., 1923, xxxvii., 1.
McIntosh, J., and Scarff, R. W.: Proc. Roy. Soc. Med. (Sect. Path.), 1927–28, xxi., 1; Jour. Path. and Bact., 1929, xxxii., 551.
Noguchi, H.: Jour. Exp. Med., 1915, xxi., 539.
Ohtawará, T.: Scient. Rep. Gov. Inst. Inf. Dis., Tokyo, 1921, i., 203.
Pette, H.: Münch. med. Woch., 1928, p. 207.
Reynals, F. D.: Compt. rend. Soc. biol., 1928, xcix., 6.
Uhlenhuth, P., and Bieber, W.: Zeit. f. Immun., 1923, xxxv., 311.
Watanabe, J.: Arch. f. Hyg., 1924, xcii., 359.

Public Health Services.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

THE following table brings out some remarkable contrasts in the 1928 statistics of three of our largest cities :—

Name of district and estimated (R.-G.) population.	Birth-rate.	Death-rates per 1000 of the population.					Death-rates per 1000 births.		
		All causes.	Tuberculosis.	Cancer.	Respiratory diseases with influenza.	Heart disease.	Infant and neonatal mortality.	Young child (1–5 yr.) mortality.	†Maternal mortality from childbirth.
Glasgow .. (1,060,500)	22·3*	14·8*	1·22	1·35	2·7	1·9	107/39	64	8·3
Birmingham . (968,600)	18·1	10·9	1·00	1·36	1·7	1·8	65/30	25	3·8
Liverpool .. (866,000)	22·1	13·2	1·38	1·27	3·0	1·0	94/32	54	3·4

* According to the local estimate of the population the Glasgow birth-rate is 20·6 and the death-rate 13·7.

† The death-rates from puerperal sepsis alone were: Glasgow, 3·8; Birmingham, 1·9; Liverpool, 1·0; and the proportion of stillbirths to live births: Glasgow, 4·4 per cent.; Birmingham, 3·4 per cent.; Liverpool, 4·0 per cent.

Glasgow.

In this report Dr. A. S. M. Macgregor devotes special attention to the housing problem. The number of houses completed during the year ended August 31st was the highest for half a century—namely, 6885—and included 132 of two rooms, 4184 of three rooms, and 2238 of four rooms. There has also been much building beyond the city boundary. These operations, combined with slum clearance and rehousing, are causing a salutary redistribution of the population. In certain areas there are slight signs of a diminution of overcrowding, but a large volume of overcrowding is due to the occupancy of small houses by large families. The crux of the problem is the provision of houses within the competence of small wage-earners. The report of the supervising nurse-inspector, whose duty it is to visit the families transported from the slums to new houses, shows the extreme difficulty of her task. An effort has recently been made to provide a cheaper house, this type being known in Glasgow as the "intermediate house." In January, 1928, 972 three-roomed and 258 four-roomed houses of this type were available at weekly rentals of 12*s.* 6*d.* and 14*s.* respectively, inclusive of rates, and the corporation decided to let them to overcrowded families with a maximum income of £4 per week, but preferably with less. The director of housing is at an early date to submit the design of a three-roomed house to be let at 10*s.*, and Dr. Macgregor hopes this cheaper "intermediate" house will soon be available for families whose incomes are less than £3 per week, but whose needs are no less clamant than those with higher incomes. The Glasgow Corporation thought they had obtained power to restrict the rentals of farmed-out houses, but a legal decision has shown that it will be necessary to insert a special clause with this object in the next provisional order promoted by the corporation.

The first recorded outbreak of poliomyelitis in Glasgow occurred in 1928. The acute cases coming to the knowledge of the health department numbered 112 and there was usually a long delay between the date of sickening and the official discovery of the case, until the existence of the epidemic had been made known to the medical profession. During the first five months only 10 cases sickened; during June, 5; July, 16; August, 25; September, 28; October, 22; November, 5; and December 1. There was a tendency to grouping in areas, a feature noted in the Glasgow encephalitis outbreak of 1924. The disease showed no predilection for any social class; there were 58 males and 42 females affected; 82 cases occurred under 5 years, 18 from 5 to 10 years, 4 from 10 to 15 years, and 8 were over the age of 15. In two instances cases were associated—two infants living in the same tenement building sickened on July 28th and August 1st respectively, and there was a group of six cases in the junior classes of a day school. There was no evidence of abortive cases, but Dr. Macgregor points out that such evidence is much more difficult to obtain in a town than in a rural area. In 79 per cent. of the cases paralysis appeared within seven days of onset; eight cases ended fatally—four on the third day, three on the fourth day, and one on the fifth day of illness. As regards the relation of these nervous diseases to influenza Dr. Macgregor shows the relationship of encephalitis epidemics to previous influenza epidemics, and points out that the influenza epidemic of January to February, 1929, was preceded by this poliomyelitis outbreak and associated with a concurrent outbreak of cerebro-spinal fever.

The discrepancy between the local and the R.-G. population is now 86,608, and makes an appreciable difference in the birth- and death-rates. There were 23,649 births and 7082 mothers attended the prenatal clinics. The mortality from puerperal sepsis—namely, 3·8 per 1000 births, was the highest ever recorded. 692 cases of ophthalmia neonatorum were notified, but no damage to sight was recorded among the survivors.

Birmingham.

Dr. H. P. Newsholme reports many improvements in environmental hygiene. The hydrographical survey of the river Trent has been continued. The waters of the river Tame have been remarkably clear, but there has been no appreciable increase in the oxygen content. Small fish have, however, been observed in the river in the Witton area of the city. There has also been a big improvement in the oxygenation of the upper river Tame. An increasing number of authorities are favouring the principle of admitting liquid trade-waste into the sewers, and in one instance at Bilston the admission of this waste has actually improved the standard of purification. Several firms have constructed settling tanks, and in one instance the recovery of the oil has more than compensated the firm for the expenditure incurred. The Birmingham Tame and Rea Board is increasing its bio-aeration installation from a capacity of 7½ to 20 million gallons. The policy of abolishing tipping has been continued, and the percentage of refuse tipped has been reduced from 34 in 1924 to 10 in 1929. The percentage of standard dust-bins is now 99. A new scheme has been introduced for converting vegetable refuse, which is incombustible and especially liable to cause a nuisance if tipped, into a fertiliser. New by-laws have been drafted for that very unsatisfactory class of dwelling known as houses let in lodgings. An attempt was made by a local Bill in the spring of 1929 to obtain powers to restrict excessive rentals in these premises. Though the gravity of the abuse was not denied, the clause was rejected on the grounds that general and not local legislation was needed to deal with the problem. The new houses built numbered 4992, of which 3505 were municipal. There is still a considerable shortage which makes it difficult to close and demolish unfit houses. Houses with only a short lease of life have, therefore, to be repaired as an alternative to closure.

The examination of pasteurised milk shows that the "positive holder" gives better results than the "flow retarder" type, and that there is extreme variation with high bacterial count in the case of the "flash-point" type. The prices per pint of graded milks are given as: Certified, 5*d.*; Grade A (T.T.), 4½*d.*; Grade A, 4½*d.*; Grade A pasteurised, 4*d.*; Pasteurised, 4½*d.* The cows in the city sheds at the end of the year numbered 1532, and amongst them 19 were dealt with under the Tuberculosis Order—viz., 8 with tuberculosis of the udder, 9 with

"emaciation," and 2 with "chronic cough, &c." Of 1056 samples of milk examined 9·1 per cent. were found to be tuberculous as compared with 7·1 per cent. in the previous year. The 1056 samples included 77 from city dairies of which 5, or 6·1 per cent., were infected. The local scheme for encouraging tubercle-free herds does not progress. At the beginning of the year the scheme included 21 herds with 713 cows. Two new herds came in, but four were withdrawn owing to the high percentage of reactors. At the end of the year there were 19 herds with 688 cows in the scheme. Of 1774 cows tested in connexion with the scheme 1546 passed, 213 failed to pass, and 15 were doubtful.

The general death-rate, the infant mortality-rate, and the birth-rate were the lowest ever recorded. The average general death-rate for the central wards was 14·0, for the middle ring 10·8, and for the outer ring 8·7. The death-rate from respiratory diseases was for the central wards 2·43, for the middle 1·55, and for the outer 0·99. There were 54 known cases of small-pox with one death. Most of the cases were in connexion with a poor-law institution. There were 1552 notifications of diphtheria with 70 deaths, and Dr. Newsholme says it is obvious from a review of the cases that bad housing conditions, overcrowding, and insanitation play a large part in its propagation. It is not infrequent to discover several children at one and the same time occupying the same room all suffering from diphtheria. A disturbing feature is the insidious onset causing delay in obtaining medical advice. A circular has been issued to medical practitioners asking them to administer antitoxin in doubtful cases without waiting for the result of the swab examination.

Some increase in the prevalence of dysentery due to an organism of the Flexner type is reported. There were 34 known cases. An outbreak affecting nine children occurred in the ward of an institution. Another outbreak of 16 cases occurred in some houses let in lodgings and was attributed to an ex-soldier carrier. One affected child of 2 years, who was in a debilitated condition previous to infection, died. Two families were affected by food poisoning. In one case the infection was due to *Bacillus aertrycke*, and the vehicle of infection was "à la mode" beef. In this case there were two patients and one death. The beef had no objectionable odour or unpleasant taste. In the other family there were two deaths and the medium of infection was thought to be "pig scratchings" or black puddings. The diagnosis of encephalitis lethargica was confirmed in 41 cases. Twenty-three were males with 13 deaths and 18 were females with 9 deaths. The problem of post-encephalitis still remains one of urgency, and these unfortunates "drift as in-patients or out-patients from one hospital to another leading a life of continual misery." There is no substantial difference in the rate of infant mortality during the first fortnight after birth in the central, middle, and outer wards, and the same observation is applicable to the stillbirth rate.

A special inquiry into deaths from pneumonia in children under 5 years by Dr. Ethel Cassie brings out the fact that the common type of pneumonia seen in young children is dependent to a great extent on environmental conditions. Another striking point is the high incidence of bad health and especially of pulmonary tuberculosis among the parents of the affected children. The training course for health visitors established jointly by the University of Birmingham and the public health committee in the autumn of 1927 has proved most successful in encouraging a supply of properly trained health visitors for the district. The number of ultra-violet light clinics has been increased from five to nine, and 1375 children and 21 mothers received the treatment. The number of expectant mothers who made use of the medical help insurance scheme was 3068, and medical help was sent for in rather more than a third of the cases. The cost to the corporation works out roughly at 18*s*. per case for both insured and uninsured.

Both the incidence of ophthalmia neonatorum and the damage resulting from this infection were heavier in 1928 than in any recent year. There were 530 notified cases as compared with 409 in 1927. Of the affected infants 18 had scarred eyes, and of these four were rendered quite blind, three had grave impairment of vision in both eyes, and 11 had permanent damage to one eye, the sight being completely lost in three cases. The factors responsible for this increase in the incidence and the severity of the disease are discussed. There was coincidently an increase in both male and female cases attending the V.D. clinics for gonorrhœa. No changes have been made in the prophylactic precautions adopted against ophthalmia or in the hospital provision for the cases which occur. "The majority of the patients received out-patient treatment until or unless there was clearly need for in-patient treatment," and the experience of 1928 seems to indicate as stated in the report that "early and prompt admission to a hospital bed for all but the mildest cases is therefore to be recommended."

Liverpool.

Dr. A. A. Mussen reports that the city boundary was extended on April 1st, 1928, to include the parishes of Croxteth Park and West Derby. The area of the city has thus been increased from 21,219 to 24,772 acres.

The building of the new abattoir has been begun. The subsidy houses erected during the year were 2339 municipal, and 298 by other enterprise. In 1919 the Housing Committee began to erect houses in the suburbs, and up to the present 17,432 and 169 flats have been completed and 747 houses are in progress. The difficulty with regard to the removal of insanitary houses in the congested part of the city will be lessened by the erection of 260 tenements (in progress) in Melrose-road and 198 in South Hill-road, Dingle (completed). The Queen Anne-street area has now been approved. This site consists of $5\frac{3}{4}$ acres, upon which it is proposed to erect 408 houses, which will form another addition to the sanitary dwellings in the central area.

At the end of the year influenza deaths began to increase, the prelude to the most serious visitation of influenza since 1918–19. The pandemic began on the western seaboard of the U.S.A. in October, 1928, and reached its height on the Pacific Coast on Dec. 8th. A fortnight later it reached the Eastern seaboard and appeared in Glasgow on Jan. 12th. Shortly afterwards Northern Ireland and the continent were attacked. The epidemic definitely began in Liverpool in the third week of January and reached its height in the week ended Feb. 2nd, when the general death-rate was 37·8. Liverpool was fortunate in getting the epidemic over before the really severe weather, and suffered less than many other large towns. Room was made for the numerous pneumonia cases in the poor-law hospitals by the transference of other types of disease to the city hospitals. During the first quarter of 1928 there were two cases of small-pox. One attended a doctor's surgery and was promptly isolated; the other case was a child in a gipsy caravan. There was no further spread, and Dr. Mussen points out that the child population of Liverpool is relatively well vaccinated. During the year the city arranged with 12 adjoining local authorities to treat their small-pox cases in return for an annual retaining fee and an additional payment per case admitted. There were seven Liverpool cases of anthrax, four among handlers of hides, one of a female who had to handle East Indian wool, and two among tanners' labourers. During the past five years striking results have been obtained at the City Hospital, Fazakerley, by serum treatment; 31 cases treated all made a good recovery without the excision of the malignant pustule. During the same period three moribund cases were taken in and died within a few hours of admission. Of the two 1928 cases, which ended fatally, one was diagnosed too late and the other by his own neglect was admitted to hospital too late. Steps have been taken to inform the

Liverpool hide and skin trades of the successful results of the serum treatment. A bull suffering from anthrax was slaughtered in Cheshire and the carcass sent to the Liverpool abattoir. The Cheshire butcher who dressed the carcass was seriously ill for some weeks. Those who handled the meat at the Liverpool abattoir received preventive doses of the serum and remained well.

Good results are claimed for light treatment at the Carnegie centre and at the Children's Hospital for non-pulmonary tuberculosis, Leasowe; and the medical staff who treated tuberculosis at Fazakerley Hospital are convinced that "light treatment is of very definite value." All degrees of inflammation were included in the 545 notifications of ophthalmia neonatorum. The damage done included one blinded child and one with the sight of the right eye affected. The total births numbered 19,120 and 8702 expectant mothers attended the 28 prematernity clinics, which are held weekly in Liverpool. Dr. Mussen complains of the delay in notifying tuberculosis; 22 per cent. of the pulmonary cases notified died before the end of the year, and 216 of the 1148 deaths from tuberculosis were those of unnotified cases. The attendances of gonorrhœa cases at the Seamen's Dispensary have been much reduced, as a shorter time is required for cure and irrigations since the installation of electrical treatment apparatus.

The transport of milk by motor vehicles on the road is increasing and has many advantages. Thus the farmer has his empty churns returned direct to the farm and the dairyman is saved the expense of collecting his milk at the railway station. During 1928 there was a considerable increase in the quantity of designated milk. The cow population of Liverpool is 3947, and amongst them 25 cows with tuberculous udders were found. 488 samples of outside milk were examined and 34, or 6·9 per cent., were found to be infected with tubercle.

SCHOOL MEDICAL SERVICE.

—	No. on roll.	Average attendance	Routine inspection.	Special exams. and reinspections.	Percentage of defects.
City of Liverpool	Not stated.		45,110	61,757	18·3
City of Nottingham	40212	35,938	10,610	32,597	20·7
Cambridge	6924	6266	2141	2335	10·6
Scarborough	Not stated.		1541	995	17·0

Liverpool.

THE immense improvement in physique and general health brought about at least partially by the activities of the school medical service is strikingly demonstrated in this report.

Dr. A. A. Mussen quotes from a report on the condition of the Liverpool school-children in 1907 descriptions of malnutrition, ill-clothing, and physical defect which seem incredible to-day. Dr. Mussen also reproduces statements from two head teachers, whose long experience enables them to recall the state of the children 20 years ago when teaching in a slum school was repulsive to many because of the dirt and its results. Quite half the boys were barefooted, and the teacher recalls the picture of "older boys carrying on their backs little chaps unable to walk because of festering sores on their feet." Another telling picture of the improvement is a graph showing the fall in the exclusions for verminous conditions, from over 950 in 1910 to under 20 in 1928. Dr. Mussen mentions some of the facilities now established for dealing with school-children, including residential open-air treatment in the committee's own institution at Woolton Vale, and the 30 beds reserved at Torpenhow, adding that there will be soon two new day open-air schools in the city. He makes special mention of the extensive and beneficial work carried out by the Committee's Inspector of Physical Training, the report of which appears as an appendix.

The care of pre-school children is now recognised as essential, and in 1927 arrangements were made for their treatment when suffering from otorrhœa or squint. Parental ignorance prevents more extensive dental treatment, the proportion of parents accepting treatment being less than three-fifths of that for the whole country. The charge (6*d.*) may have been responsible in some cases and the extension of free dental treatment is worth considering. But ignorance is the real difficulty in this matter and also in connexion with the refusals of the facilities afforded in the stammering class. In another connexion difficulty is caused by the mental attitude of the children themselves; 34 per cent. of those who had been provided with glasses were found not to be wearing them, the proportion rising to over 50 per cent. in certain schools. Often these children are afraid of ridicule. However, the marked change of attitude of parents and children to school medical work noted in Dr. Mussen's introductory pages will no doubt extend and the early removal of the obstacles still in the way of complete success can be anticipated.

Nottingham.

The earlier pages of the report by Dr. E. M. Wyche are taken up by photographs of facilities for treatment and examples of the fine results. Soon after comes a diagram showing the comprehensive scheme for diagnosis, treatment, and care, and the introduction to the text of the report shows how this organisation has been gradually built up. Among the more recent extensions is the orthopædic scheme dating from 1925. Two gaps remain in this work; the lack of a special school for the 377 cripples still in elementary schools, and the difficulty in securing enough beds for orthopædic cases; this latter difficulty is likely to be obviated shortly, when the new Harlow Wood Orthopædic Hospital is completed. An apparatus for ultra-violet ray therapy was installed in 1927, and an interesting account is given of the benefits obtained in certain cases. Plans are under consideration for a large open-air recovery school, a new minor ailment clinic, and an additional special school for 160 mentally defective children. Except for a school for physical defectives, which is lacking, there will soon be almost complete arrangements for care and treatment in the city, where, moreover, the value of the clinics is being increasingly realised by the private practitioner. A scientific study of the problem of mental deficiency made by Dr. A. A. E. Newth suggests that bad scholarship, poverty, and large families tend to be associated.

Cambridge.

The percentage of defects found at routine inspections in Cambridge is below the average for the country and so are the numbers of some of the groups of exceptional children. In any district this circumstance may be due to fortunate local conditions or to variations in the standard of ascertainment of defects. This year's figures are not quite so low as those of previous years. Dr. A. J. Laird attributes the increase to the larger number of children suffering from enlarged tonsils, adenoids, anæmia and debility, due, in his opinion, to the recent increased prevalence of measles, scarlet fever, and diphtheria. The general physique of the Cambridge children is very good and is still improving, but the number of delicate children (397) is very high, so that there was ample justification for the provision of an open air school in July.

The dental scheme, under the direction of Mr. W. Baird Grandison, is so thorough that every elementary school child in Cambridge has the opportunity each year of dental inspection and treatment, and in 1928 out of the 6266 children in average attendance, 6080 saw the dentist and 2996 received treatment. As a result of good work extending back for 21 years, the dental condition of the children has steadily improved, 34 per cent. of them had, this year, no decay in either dentition and there was an average of only 4 unsaveable permanent teeth among batches of 100 children. 886 children took no advantage of the facilities

offered. Mr. Grandison thinks that this was due, not so much to antagonism or ignorance as to inconvenience—for example, the mother might find difficulty in accompanying the child at the time appointed.

With such figures as 94·9 of sound temporary teeth after treatment, those responsible may be gratified by the success of the Cambridge dental scheme.

Scarborough.

Dr. S. Fox Linton introduces a detailed report by Dr. Anne Roxburgh. Scarborough is a town with rather a small child population, and there are some fortunate local circumstances and energetic social workers. The small numbers have perhaps been the reason for the absence of special schools; accommodation has been found for several defective children in institutions belonging to other authorities. There is no open-air school, nor is it deemed so essential as in the large and industrial towns; but for playing fields a piece of ground has been levelled on the Castle Hill and a large field has been rented by the Education Committee on the Northstead estate. The authority does not provide spectacles gratuitously; help is given to the poor children by the Amicable Society, often repaid by the parents in small weekly amounts. This Society also supplies cod-liver oil, milk, and free meals when needed. There are few cripples, so that an extensive orthopædic scheme is not wanted; but a clinic is held at the local hospital, attended by the orthopædic surgeon, Dr. H. L. Crockatt, and a massage sister. Institutional treatment is obtained when required at the Kirbymoorside Orthopædic Hospital. Cases of chronic deformities, such as those produced by old infantile paralysis under treatment by private practitioners or at the hospital, may need massage. This the poor can obtain by the help of the Council of Social Service, the parents paying what they can towards the cost.

Some at least of the reduction in the number of infantile deformities may be due to the activity of the infant clinic, where the health visitor has the assistance of a strong body of voluntary workers; several cases of early rickets are at present under treatment there. Another factor for good is doubtless the nursery class, at which the infants are kept under close medical supervision. X ray treatment for ringworm will be provided by a private arrangement with a skin specialist in the town.

Though there is no special M.D. school, there is a really adequate class for dull and backward, under a specially trained teacher, who has this year been given an assistant. A Council of Social Welfare, working in conjunction with the Yorkshire Association of Mental Welfare, takes over the after-care of children leaving this class. While in many branches of the work the ordinary official methods have not been developed, keen unofficial agencies have creditably filled the gap.

MENTAL HOSPITAL REPORTS.

THE 132nd report of *The Retreat, York*, records the gratifying fact that during the year 1928 over 69 per cent. of the patients admitted came as voluntary boarders, and the medical superintendent concludes that the era of the certified lunatic is drawing to an end. On Dec. 31st there were 210 patients on the books, the number of admissions (126) being the highest on record. The recovery-rate was 25 per cent., which is a high figure for the standard in use. A patient is only put in the "recovered" group when he is adjudged fit to resume his ordinary occupation without further supervision. The death-rate was 8·2 per cent. The general health was good, except for an outbreak of very mild paratyphoid fever which affected six patients and one nurse. A house was taken at Whitby for the summer months, and was much appreciated. The further development of occupational therapy is being considered, and every effort is made to induce the patients to share in their own entertainment. Fifteen patients have parole outside and 34 inside the grounds. The main part of the building had to be re-roofed last summer; the slates taken away were the original ones put on in 1793. Fourteen male and 20 female nurses are certificated in mental nursing; a sister, who was appointed matron of the Gloucester County Mental Hospital last year, was the seventh Retreat official to be promoted to a matron's post within six years.

James Murray's Royal Asylum, Perth, published its 102nd annual report for the year 1928–29. Ninety patients were admitted during the year—a record number—and the total on the books on March 31st was 192, an increase of 55 in four years. This increase has severely taxed the accommodation of the hospital, and a self-contained and detached reception block for 40 patients is to be built. The beds will be about equally divided between private rooms and dormitories, and the block will have its own nursing and domestic staff. There will be a surgery and dental room, clinical rooms, a laboratory, facilities for hydrotherapy and continuous baths, and an electrical treatment room with X ray apparatus and ultra-violet lamps. Acute cases will be sent to this block. The building has been so planned that another one like it can be erected near by in a few years if need arises. Many of the patients—over 62 per cent.—were admitted on a voluntary basis, and of these rather more than two-thirds were able to leave hospital restored or improved. Only about half the certified patients were discharged recovered. One general paralytic, treated by malaria followed by intensive antisyphilitic medication, has now been managing a successful business for 18 months. The death-rate was 9 per cent., and post-mortem examinations were made on half the fatal cases. The staff suffered a good deal from sickness during the year, but the hospital was remarkably free from epidemic disease despite the severe weather; there was only one case of influenza and no tonsillitis. A long series of patients was treated by protein shock and another series by ovarian extracts, but the results were confused and uncertain, as were also the results of ultra-violet therapy. Septic foci have been sought and treated, and a number of urinary antiseptics were tried. The occupational therapy department was attended by a great many patients; rug-making, basket-work, leather-work, and wood-carving all attract much interest. Open-air treatment is extensively used. The dairy herd has been disposed of; the fruit and vegetables did fairly well. A good deal of renovation has been carried out, and old-fashioned casements have been replaced by large panes or vita-glass. In January the carriages were replaced by a 24-h.p. seven-seater Austin limousine. Nine nurses sat for the R.M.P.A. certificate and were all successful, but there is a dearth of candidates for the State certificate.

At the beginning of this year there were 668 patients in the *City of Cardiff Mental Hospital*, an increase of ten on the previous year. The death-rate was 9·26 per cent. and the recovery-rate 38·7 per cent. The general health was good; there were three cases of tuberculosis, three of erysipelas, one of scarlet fever, and one of paratyphoid B. General paralysis was the cause of 34·84 per cent. of the deaths. Autopsies were held in all cases in which permission could be obtained. The dental surgeon has attended regularly throughout the year; the gynæcologist has examined 32 patients and the aurist 53. A wireless set has been installed; its cost was largely borne by members of the Japanese Community in London, in recognition of the care of certain Japanese patients in the hospital. The out-patient clinic in psychiatry is held weekly at the Cardiff Royal Infirmary, and the secretary attends there to follow up discharged cases. Various physiological tests are carried out on all suitable new patients, and investigations are being made into the condition of the vegetative nervous system, the blood cholesterol and hydrogen-ion concentration, and the carbon dioxide combining-power of plasma.

All but three of the male wards are nursed by women. Three nurses and one attendant passed the final State examination during the year.

There were 1081 patients in the *County and City of Worcester Mental Hospital* at *Powick* at the end of 1928. The recovery-rate for the year was 32·6 per cent. and the death-rate 4·7 per cent., the principal causes of death being old age (26 per cent.), heart disease (20 per cent.), and phthisis (12 per cent.). Autopsies were held on 68 per cent. of cases. Apart from a mild epidemic of influenza in the spring, the general health was good. Only six patients, all men, have parole beyond the estate; 32 men and seven women are free within the grounds. A dentist visits the hospital once a fortnight. The farm showed a profit of over £600 on the year's working, but does not supply enough milk for the needs of the institution. The visiting commissioners express anxiety about the use of nearly 200 twelve-ounce tins of condensed milk weekly, especially as margarine and not butter is given for breakfast and tea. The hospital is handicapped by having no electricity and very few clinical rooms. The committee is considering the introduction of an electric supply. One male and two female nurses gained the R.M.P.A. certificate during the year.

The report of the *Brighton County Borough Mental Hospital* at *Hayward's Heath* has as frontispiece an aerial photograph of the institution. There were 895 patients in the hospital at the end of 1928. Forty-five of the 264 admitted were over 60 years of age, and the recovery-rate was therefore a little lower than last year—36·6 per cent. The death-rate was 9·15 per cent. Twenty patients suffered from tuberculosis, but otherwise the general health was good. Eight general paralytics were sent to Hellingly for malarial treatment, but only one showed any improvement. Forty-six patients have been on full parole and 52 more on parole within the grounds. The hospital is crowded during the day, and the committee are considering the purchase of a neighbouring estate for an admission hospital. The dentist attended 685 patients during the year and extracted 757 teeth. One ward on each side is administered on the open-door principle. Ultra-violet ray treatment has been found valuable for convalescents. The out-patient clinic at Brighton served 438 patients, including 98 new ones during the year, and has done very good work. Four nurses obtained their R.M.P.A. certificate, and it is hoped that improvements in accommodation for the staff will diminish the matron's difficulty in securing suitable female nurses.

The *West Sussex County Mental Hospital* (*Graylingwell, Chichester*) had 877 patients on the books at the end of 1928, an increase of 65. The hospital is already uncomfortably overcrowded, and another two years must elapse before the new buildings will be available. The provisional scheme includes a block for 115 women, a villa for 50 women, an admission hospital for 35 women, and a nurses' home. Meanwhile the heating system of the old blocks is to be modernised. The medical superintendent hopes that the new admission hospital will, by the time it is ready, be allowed to receive patients on a voluntary basis. The death-rate was 6·1 per cent. and the recovery-rate 32·7 per cent. The general health throughout the year was good. There was one case of severe chicken-pox and a few cases of influenza. Two patients and the medical superintendent contracted typhoid fever. Five major operations were performed and one general paralytic was sent to Knowle for malarial treatment, but he did not improve. During the summer the usual picnics to the seaside were arranged. Several patients have been allowed out on leave for periods varying from a day to three weeks and parole beyond the estate is given to 23 patients, and within the grounds to 50 more. Three male and five female wards are administered on the open-door principle. Two nurses and one attendant obtained their R.M.P.A. certificate and one nurse passed the final State examination. The medical superintendent mentions the excellent work of the nursing staff in the face of peculiar difficulty incident to the overcrowding.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED AUGUST 24TH, 1929.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 139 (last week 120); scarlet fever, 1678; diphtheria, 793; enteric fever, 89; pneumonia, 490; puerperal fever, 40; puerperal pyrexia, 95; cerebro-spinal fever, 8; acute poliomyelitis, 14; acute polio-encephalitis, 3; encephalitis lethargica, 24; dysentery, 6; ophthalmia neonatorum, 110. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the Metropolitan Asylums Board on August 27th–28th was as follows:—Small-pox, 144 under treatment, 24 under observation (last week 147 and 1 respectively); scarlet fever, 1313; diphtheria, 1430; enteric fever, 14; measles, 325; whooping-cough, 228; puerperal fever, 26 (plus 11 babies); encephalitis lethargica, 123; poliomyelitis, 1; "other diseases," 20. At St. Margaret's Hospital there were 14 babies (plus 8 mothers) with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns, including London, there was no death from small-pox, 3 (0) from enteric fever, 18 (5) from measles, 3 (1) from scarlet fever, 24 (2) from whooping-cough, 20 (3) from diphtheria, 67 (11) from diarrhœa and enteritis under two years, and 17 (2) from influenza. The figures in parentheses are those for London itself.

Of the deaths from diarrhœa 7 each were reported from Liverpool and Hull, 6 from Birmingham, and 4 from Sunderland. Liverpool recorded 5 deaths from whooping-cough and Manchester 3. The deaths from enteric fever occurred at Wood Green, Sheffield, and Cardiff.

The number of stillbirths notified during the week was 259 (corresponding to a rate of 37 per 1000 total births), including 55 in London.

IRELAND.

(FROM OUR OWN CORRESPONDENT.)

A Memorial to Sir William Thompson.

A MEETING of the friends of the late Sir William John Thompson has been held to consider the establishment of a memorial to him. The meeting decided to appeal for funds to establish a tuberculosis village settlement in connexion with the Peamount Sanatorium, Co. Dublin. Sir William was greatly interested in anti-tuberculosis work and was, indeed, one of its pioneers in Ireland. He had been honorary treasurer of the Peamount Sanatorium since its foundation some 17 years ago, and had been interested for some time in the project of adding to its utility by a tuberculosis settlement. If adequate funds are forthcoming no doubt the Papworth model will be followed, and the Memorial Committee arranged with Dr. Varrier Jones to give a lecture a few days ago on his work at Papworth. At the sanatorium he addressed a large audience, including many of the patients, and having described the object and achievement of Papworth, he showed a large number of illustrative lantern slides.

Examination of Milk.

The difficulties arising in the examination of milk in regard to the amount of fats present were exemplified in two cases which came recently before one of the Dublin magistrates. A milk-dealer was prosecuted by the Dublin Corporation on the ground that certain milk offered for sale contained only 2·7 per cent. of fats, the legal standard being 3 per cent. Evidence was submitted, in defence, of a finding of 3·67 per cent. of fats in another portion of the same specimen. The magistrate adjourned the case for the report of the State analyst on the third portion of the specimen. His examination found 4·9 per cent. The magistrate dismissed the case with costs. In a similar case the three analyses gave percentages of 2·4, 3·59, and 6·7. This case also was dismissed with costs.

SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

Investigation of Maternal Mortality.

THE Department of Health for Scotland has taken an important step to secure the closer investigation of maternal deaths during pregnancy or within a month after the termination of it. This was one of the many recommendations made by Lord Salvesen's Committee on Puerperal Morbidity and Mortality, which reported to the Scottish Board in 1924. Why it should have taken five years to give effect to the recommendation may not be easy to explain, but the new department has lost no time in creating the necessary machinery and in issuing instructions. The form of death certificate in use in Scotland has now, under the powers of an Order in Council dated June 8th, 1929, been altered "to provide for a statement by the medical attendant if, in the case of a married woman, the death occurred during pregnancy or within four weeks of the termination of pregnancy." The Registrar-General for Scotland has notified the alteration in the certificate to the local registrars and authorised them to supply medical officers of health, when requested to do so, with a special return in a prescribed form in respect of cases in which the question as to pregnancy is answered in the affirmative. Registrars will be prepared to make these returns from Oct. 1st next. The second difficulty is the question of method. Fortunately, Aberdeen's ten years' systematic investigation (published by the Scottish Board of Health last year) provides a model and the Department now issues an elaborate form and a memorandum of directions to every medical officer of health. This is the most important step yet taken in Scotland to get to grips with the causes of deaths associated with pregnancy. There is every hope that practitioners will coöperate as they did in Aberdeen, since every care is taken to keep the investigation of individual cases strictly confidential.

Mental Defectives and the Public Safety.

At a Glasgow sitting of the High Court of Justiciary, a plea of insanity in bar of trial was accepted on behalf of a young seaman charged with shooting and murdering a woman in a Glasgow public-house. But insanity was not the whole case. Dr. Gilbert Garry, Duke-street Prison, considered the prisoner of unsound mind and unfit to plead; he did not appear to appreciate the difference between right and wrong. Dr. J. H. Macdonald, of Hawkhead Mental Hospital, regarded him as a moral imbecile and insane. Dr. R. D. Clarkson, under whose charge he had been at the Royal Larbert Institution, said the man had no sense of moral obligation and that he (Dr. Clarkson) had, without effect, recommended that his detention at Larbert should be extended. He had examined the man that day and found him in the same mental condition as when he was a boy. He declared that the accused, for the protection of others, should have been placed under proper supervision and control from the time he was 8 or 9 years old right through his life.

The Lord Justice-Clerk (Lord Alness), who tried the case, made some observations on it at an informal banquet given by the Lord Provost and magistrates. It raised the question, he said, whether adequate machinery existed for preventing persons being at large in the community when their mental state rendered them a danger both to themselves and to others. In this case an individual was found to be of unsound mind and unfit to plead. He was also described as having been in the same mental condition when released some time before from a mental institution. In that mental state, apparently, he went about the world, with the result that he shot a young woman dead, and attempted also to shoot a man. That, to his mind, seemed a disquieting state of affairs. He was not suggesting blame to anyone in connexion with the case, but he did suggest in the interests of the safety of the public consideration by the appropriate authorities whether machinery could not be devised to prevent the recurrence of such deplorable incidents.

UNITED STATES OF AMERICA.

(FROM AN OCCASIONAL CORRESPONDENT.)

White House Conference on Child Health.

President Hoover's interest in child health has long been known in America. His presidency of the American Child Health Association was but one indication of this interest, and another is his intention to summon a White House Conference on the health and protection of children. The first meeting of the planning committee was held in Washington on July 29th and was addressed by President Hoover, who hopes that the policies adopted by that Conference will be followed up by definite organisation throughout the country. Progress in this direction must for the most part be made by voluntary action and by activities of local government, but the Federal Government will attempt to secure some measure of unity as to view and as to programme.

Every subject bearing on child health, including the difficult subject of child labour upon which Congress has twice attempted to legislate without success, is to be brought under consideration. A sum of half a million dollars from private sources has been placed at the President's disposal to cover the expenses of the preliminary committees and for investigations which they may require. The Secretary of the Interior, Dr. Ray Lyman Wilbur, a past president of the American Medical Association, will have general charge of the Conference. The planning committee itself is drawn from organisations of quite diverse interests, and has a personnel which will inspire confidence.

Diploma Forgeries in Illinois.

Five men have recently been indicted before a grand jury in Chicago for the sale of licenses to applicants who were not properly qualified to practise medicine. True bills were returned on July 30th. The chief among this group is W. H. H. Miller, who was formerly director of the State Department of Education and Registration. This man was found guilty of selling licenses while in office, and eventually discharged, but is said to have claimed since his discharge that he retained all his influence in the department. The evidence is said to indicate that more than 1000 forged licenses have been issued. One man, said to be in possession of such a license for which he is supposed to have paid $1500, has already been arrested. He was found working as an orderly at the West End Hospital. A blank abortion release slip is alleged to have been found in his pocket.

Silver Polish Poisoning.

Several cases of acute poisoning of guests in hotels have been reported to the New York State Department of Health and are under investigation. A typical severe case is that of a man, aged 45 years, who was seized suddenly with nausea and severe colic. From midnight until 2.30 A.M. he vomited continuously, and thereafter suffered from tenesmus, diarrhœa, nausea, and continued retching. The patient was now covered with profuse perspiration, the skin cold, pallid, and cyanotic. The pulse was rapid, of low tension, and irregular. After three hours of active treatment with applied heat, hot coffee by mouth, and caffeine hypodermically, the shock subsided. One-eighth grain of morphine was placed under the tongue and the patient went to sleep. Recovery was uneventful. Three other persons who had partaken of the same evening meal

had similar though less severe symptoms. The State Department of Health has found that in every case where these acute poisonings have occurred the hotel management is in the habit of employing a silver polish manufactured by a New York firm. Analysis of this firm's products gives in every case a positive cyanide reaction. One silver polish put out by them was found to contain as much as 20 per cent. of sodium cyanide. Hotel managers who have ceased to use the polish on advice from the Health Department report a cessation of symptoms among their guests.

Lethal Possibilities of Vibratory Massage.

As Sandow exercises were the fashion in England a generation or so ago, at the present time in the United States there is a vogue for vibratory massage. The modern fad is mechanical—driven by electric motor. Apparently it is not without its dangers. The case is recently reported of a man who after an hour's "exercise" in a gymnasium under the supervision of a "physical director" developed an acute soreness in the abdomen, about an inch to the right of the umbilicus, some weakness and dizziness. He had, it seems, used an electrically driven vibrating massaging belt applied to his abdomen for the space of ten minutes. Next day he passed about 15 well-formed tarry stools, after which he was short of breath and of blood, and called his physician. The latter, as well as a consultant, believed that he was bleeding from a duodenal ulcer; the consultant had at that time in hospital a patient whose ruptured appendix was attributed to the use of a similar apparatus. The committee on physiotherapy of the Medical Society of the County of New York has on record a case of severe hæmorrhage of the bladder, resulting from five minutes use of an exercising machine, and is appealing through its chairman, Dr. Richard Kovacs, for information regarding other accidents that may have resulted from such machinery.

Diet in Tuberculosis.

The opinion of 36 prominent phthisiologists has been ascertained recently on the subject of diet in tuberculosis by Dr. John B. Hawes, of Boston, by the questionaire method. The idea that the patient should be stuffed seems now to have been universally abandoned. Extra meals are, on the whole, regarded with disfavour. Egg-nogg was the subject of considerable disagreement and violence of attack on the part of some specialists, rather surprising since no reason is offered for their aversion to this particular combination. As for milk, most of those questioned favoured a maximum allowance of one quart given daily—with, rather than between, meals. A good deal of emphasis was laid upon the importance of rest immediately before and after meals. Some were strongly of the opinion that five or six glasses of water should be drunk daily, others that most patients drink too much water. It is difficult to judge of the value of these opinions without knowing on what principles they were founded.

Governor Roosevelt creates a Spa.

The Governor of New York State has decided to exploit the resources of the State in mineral waters, and has selected Saratoga as the site of a model spa. The town is already a fashionable resort in beautiful country, not many miles south of Lake George, and devoted to horse-racing. It will be of interest to observe whether those in search of health will be deterred by the present somewhat noisy display of wealth or whether the Governor's plans will overshadow the existing attractions A medical advisory committee, including the president and the director of the New York Academy of Medicine, and the professors of medicine at Cornell University and the Albany Medical College, has been appointed to assist the State Commission charged with the development project. In a speech to the annual conference of Health Officers and Public Health Nurses the Governor explained the scope of his ambition. It is his hope that Saratoga may do great good for many human ills of the people of the State, and, moreover, point the way so that other States and other mineral springs can be developed along scientific and medical lines. From the Adirondacks to Georgia there are wonderful springs on both sides of the range, and both in the west and middle west there are springs going down through the Ozark mountains and borders of Oklahoma and Texas. Those of the Rockies extend down to Montana and Arizona, and in the Allegheny Mountains. The development of all these natural advantages may follow the Saratoga scheme should this prove a success.

Dental Research in Alaska.

The first complete dental equipment, including X rays, to be sent to the Eskimos of Northern Alaska is now on its way. The expedition is in charge of Dr. Leuman M. Waugh, the associate dean of the school of dental and aural surgery of Columbia University, who has been given a temporary commission in the public health service.

Appointments.

Dr. David Rapport, who has been appointed to the chair of physiology at Tufts College Medical School, graduated from Harvard in 1912, and from the Harvard Medical School in 1916. During the next two years he worked under Sir Thomas Lewis on the effort syndrome in soldiers, and has since taught at Harvard, Cornell, and Western Reserve Universities. Dr. William G. Gallie has been appointed to the chair of surgery at the University of Toronto. He gave the Hunterian lecture before the Royal College of Surgeons in 1924 on Transplantation of Fibrous Tissues in the Repair of Anatomical Defects.

NOTES FROM INDIA.

(FROM OUR OWN CORRESPONDENT.)

The All-India Medical Council.

THE proposed Bill "to establish a Medical Council in India and to provide for the maintenance of a British Indian Medical Register" met with a further check last month. The conference of Provincial Ministers of Public Health, Surgeons-General, and Inspectors-General of Civil Hospitals, assembled at Simla to consider the proposed measure, showed considerable opposition to the Bill. Although the deliberations of the conference have not been made public it is evident that the various provinces are unwilling to transfer their present powers of regulating medical education to a centrally constituted body, despite the fact that adequate provincial representation is provided for in the proposed scheme. Nevertheless, the case for the immediate formation of an all-India council is a strong one. The suspicion that such a council would arrogate to itself the function of prescribing the courses and curricula of the universities and medical schools is unfounded. It would naturally have to be satisfied of the adequacy of the standard of instruction in any given training centre before recognising its degrees for registration, but the onus of drawing up curricula so as to conform to the standard of proficiency set up by the council would rest with the various educational authorities concerned.

Tuberculosis in Bengal.

The gravity of the tuberculosis problem in Bengal may be realised when it is stated that there are in the neighbourhood of 800,000 cases in that province. Of these, about 200,000 require sanatorium treatment and there is no provision whatever for their accommodation. Dr. A. C. Ukil in a recent address urged the immediate necessity for the establishment of provincial organisations to study the disease and to devise measures for its prevention. A beginning has already been made by the establishment on a purely voluntary basis of the Tuberculosis Association of Bengal.

A New Leprosy Publication.

The Indian Council of the British Empire Leprosy Relief Association have decided to issue quarterly a small brochure entitled Leprosy in India, which is intended to form a means of communication between leprosy workers in this country. The first number, which has just come to hand, contains informative articles on the objects of the council, on a leprosy survey in Travancore State, and on anti-leprosy work in Bihar and Orissa and in Burma. These quarterly notes are distributed free of charge to those taking an active part in the work of eliminating leprosy from India.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Capt. H. J. Chater is placed on the Retd. List.

A. M. Lawrence-Smith and B. St. John Lyburn to be Surg. Lts.

The following appointments are notified: Surg. Comdrs. M. S. Moore to *Vindictive;* J. F. Haynes to *Victory* for R.N. Hospl., Haslar; P. L. Gibson to *President* for R.A.F. Medical Officers' Course; G. L. Ritchie to *Lowestoft*; D. C. Eglington to *Pembroke*, for R.N. Hospl., Chatham; and J. F. Place to *Pembroke*, for R.N. Barracks, Chatham.

Surg. Lts. R. C. Webster to *Shropshire*, and J. Johnston to *Lowestoft*.

Surg. Lt.-Comdr. J. F. Ainley to be Surg. Comdr.

ROYAL NAVAL VOLUNTEER RESERVE.

Surg. Lts. J. B. Oldham to *Victory* for R.N. Hospl., Haslar, for training; E. C. Johnston, commission terminated on entry into R.N.; R. W. H. Tincker to *Pembroke*, addl., for R.N. Barracks, Chatham, addl., for 14 days' training; and H. M. Willoughby to *Victory*, addl., for R.N. Barracks, Portsmouth, addl., for 14 days' training.

Surg. Lt. H. M. Petty to *Pembroke*, for R.N. Barracks, Chatham, for training.

A. J. W. Beard entered as Proby. Surg. Sub-Lt. and attached to the London Division, List 2.

ROYAL ARMY MEDICAL CORPS.

Lt.-Col. R. L. Popham, having attained the age for compulsory retirement, is placed on retd. pay.

Maj. T. B. Moriarty, D.S.O., to be Lt.-Col., vice Lt.-Col. R. L. Popham to retd. pay.

The undermentioned to be Lts. (on prob.): D. A. O. Wilson, T. R. J. P. Kerwick, T. G. D. Coneys, J. G. Black, A. N. B. Odbert, Temp. Lt. C. A. Levy (and relinquishes the temp. rank of Lt.), and S. W. K. Arundell.

Lt. A. H. Weston, from the R.A.M.C., T.A., to be Lt. (on prob.).

Lt. (on prob.) T. G. D. Coneys is secd. under the provisions of Art. 205, Royal Warrant for Pay and Promotion, 1926.

Temp. Lt. H. T. Chiswell relinquishes his commn.

ARMY DENTAL CORPS.

Capt. W. Philp to be Maj.

Lt. (on prob.) E. C. Irish is confirmed in his rank.

ARMY RESERVE OF OFFICERS.

Lt.-Col. R. L. V. Foster, having attained the age limit of liability to recall, ceases to belong to the Res. of Off.

TERRITORIAL ARMY RESERVE OF OFFICERS.

Maj. S. McCausland, having attained the age limit, relinquishes his commn. and retains his rank.

ROYAL AIR FORCE.

Flight Lt. G. H. H. Maxwell is promoted to the rank of Squadron Leader.

COMMISSIONS IN THE ROYAL ARMY MEDICAL CORPS.

The following have been granted commissions as Lieutenants on probation in the Corps:—D. A'Brook, M.R.C.S., University College Hospital; D. A. O. Wilson, M.B., Queen's University, Belfast; T. R. J. P. Kerwick, M.B., University College, Dublin; T. G. D. Coneys, L.R.C.P. & S.I., Royal College of Surgeons, Dublin; J. G. Black, M.B., University of Aberdeen; A. N. B. Odbert, M.B., Trinity College, Dublin; C. A. Levy, M.R.C.S., St. Thomas's Hospital; S. W. K. Arundell, M.R.C.S., Middlesex Hospital; A. H. Weston, M.B., University of Edinburgh; and E. A. Wilson, M.B., University of Edinburgh. Two of these officers have been seconded for the purpose of completing appointments in civil hospitals.

Correspondence.

"Audi alteram partem."

PENAL TREATMENT FOR NERVOUS DISORDER.

To the Editor of THE LANCET.

SIR,—That a police magistrate should consider the penal treatment of a patient suffering from a nervous disorder proper and fitting is not very surprising, but it is rather disturbing to find that you should approve of such a proceeding as you do in your issue of August 17th (p. 351).

The case to which I am referring is that of a man who had been addicted to morphia to the extent of 15 grains a day. Under treatment this was reduced to ½ grain, and at this point the patient was discharged from treatment through no fault of his own. He was given a prescription for one single half grain of the drug. What was the man to do? Everyone knows that such a patient must somehow obtain more morphia. He seems to have regularised his position later on by getting prescriptions from other doctors, but unfortunately before doing so he falsified this prescription, and so illegally got possession of 12 grains. For this he received three months' imprisonment, with your approval.

The first point that strikes me is this: is imprisonment likely to cure such a patient? I know of one patient who was sent to prison for the crime of illegal possession of morphia, and he was not cured. The drug was cut off at once, and those who know anything of the morphia craving will realise what that means. On the day of his release, he succeeded in buying the drug without difficulty. Again, ought we doctors to applaud the fixing of the stigma of imprisonment on a patient; ought we not rather to endeavour, as we do for the insane, to lead the authorities to see that stigmas are good for nobody, and that patients will do better if treated without them.

To seduce a person into taking morphia is a grave moral offence, and is rightly punishable by law; but in what sense, legal or moral, is morphia addiction an offence. This man had not led anyone into the morphia habit, and I am unable to agree with you in your dictum that "The case shows the administration of the law in the best interests of the accused."

I am, Sir, yours faithfully,

T. A. ROSS.

Swaylands, Penshurst, Kent, August 21st, 1929.

CHORDOTOMY IN THE TREATMENT OF OSTEOARTHRITIS OF THE HIP.

To the Editor of THE LANCET.

SIR,—I was much impressed by Mr. Bankart's admirable paper in your issue of August 24th (p. 378) on the treatment of this condition by division of the spino-thalamic tracts. Before deciding to carry out the operation myself, however, I should like to learn from Mr. Bankart a little more detail. For example, how does he recognise the part of the spinal cord requiring section, and how does he divide it? In my edition of "Cunningham's Anatomy" (which I admit is dated 1906) it is stated that "as the spino-thalamic tract ascends in the cord its fibres are not gathered into a compact strand, but are more or less loosely scattered in the lateral column." Does Mr. Bankart divide as much as one-fourth of the spinal cord, and how does he guard against the danger of producing paralysis?

One other point: Mr. Bankart does not mention a method of treatment which is most useful in these cases—namely, giving the patient a pair of crutches. If the case be one in which there is no pain when the patient is recumbent, crutches entirely prevent the pain from coming on when he is up and about. Strange to say, absence of irritation in this disease appears to

favour the production of ankylosis, and when this has become sound all pain in the hip vanishes and the crutches can be discarded. Though this may take years the cure of the pain is certain.

I am, Sir, yours faithfully,

PAUL BERNARD ROTH.

Welbeck-street, W., August 24th, 1929.

To the Editor of THE LANCET.

SIR,—The operation of chordotomy clearly has come to stay, and there is no difficulty in enumerating the conditions in which for the relief of paroxysms or everlasting pain the operation will now probably be performed. The skill of the surgeon with his full and bloodless exposure makes the operation appear easy enough. Good nursing, as a rule, does the rest. But it is the physician who probably will continue to shoulder the prime responsibility. With experience of antero-lateral tract section and of medio-longitudinal section (suggested first, I believe, by Dr. J. G. Greenfield) I think that the latter operation is more easily performed than the former; also it appears to be based on a sounder anatomy. The anterior spinal artery is not injured by the skilled surgeon. It is important that the decision to operate shall be made long before the patient is worn out by his pain, by drugs, or by time. I have under observation at the moment a man on whom complete medio-longitudinal chordotomy (traumatic spina bifida) was performed a few weeks ago through four segments of his thoracic cord for the relief of crises. He appears to have therefrom no impairment of sensibility whatever to thermal stimuli.

I am, Sir, yours faithfully,

HILDRED CARLILL.

Harley-street, W., August 24th, 1929.

THE NEW VACCINATION ORDER.

To the Editor of THE LANCET.

SIR,—In regard to the new Vaccination Order, I recall that the most successful vaccinations I ever witnessed were performed by a former colleague of mine, the late Arthur Caesar, public vaccinator for the Eastern District Hamlet of Mile End Old Town. With the lower part of the cutting edge of a broad spear-headed lancet held almost flat to the skin, by a gentle incising movement he slightly lifted the epidermis forming, as it were, a valve shutting in the lymph. He never scratched with the point, scarcely drew blood, was nearly always successful, and very little inflammation followed the operation.

I am, Sir, yours faithfully,

FREDK. WM. ALEXANDER,
At one time Public Vaccinator, Western District Hamlet of Mile End Old Town; formerly M.O.H., Metropolitan Borough of Poplar.

Teddington, August 27th, 1929.

ANTIDYSENTERY BACTERIOPHAGE.

To the Editor of THE LANCET.

SIR,— As the author of the paper "Antidysentery Bacteriophage in the Treatment of Bacillary Dysentery" published in THE LANCET of August 10th, may I be permitted to reply to some of the points of criticism raised in your leading article on the subject in the same issue.

The impression created by your article in regard to my clinical results in the treatment of dysentery with bacteriophage is, that there was an initial "maximum beneficial effect" in just over 50 per cent. of the cases treated. This calculation and the expression of it can only be arrived at if we take a phrase from its context and ignore the rest. It thus represents only half, and, as may be agreed, the less encouraging half of the facts. In my "severest possible analysis" of the results, I was able to show that there were in all only 17 results that could be considered as failures, leaving 45 successes, which represents "a minimum percentage success for the treatment of 72·6." As I believe, I made sufficiently clear, this calculation is based on a reasoned interpretation of the facts, and it is the only one valuable. To it, I would add my considered judgment that "the general result of phage treatment for bacillary dysentery appears very much in its favour" as is borne out by the fact that more than "70 per cent. of the cases showed a well-defined and rapid improvement."

It is unfortunate that, through lack of space, you had to sacrifice the Table of "Clinical Records" accompanying my paper, since you appear to cast some doubt on the subsequent recovery of the cases in which the treatment was even most successful. This table would, I think, have enabled you and your readers to appreciate better the course of events from initial improvement to recovery. The word "recovery" is, I know, a very mobile one in medicine, but if there is any need to be more exacting about it in phage-cured dysentery than in other diseases, everything is in favour of the dysentery-cured patient.

As to your statement that in many cases of bacillary dysentery "the infection may be self-limiting" so that "recovery may occur without any specific treatment," I presume you mean here recovery by saline or other purgation treatment. In that case, reference to the third paragraph, p. 274, of my paper will provide a reasonable explanation of the "recovery" of the majority of such cases. In my opinion these cases are mostly phage "cures." Any doubt in regard to this may be dispelled by a persistent examination for the presence of phage of a number of acute dysentery stools—the patients being on no specific treatment whatever—when sooner or later phage will be found appearing among the recovery patients. These, then, are recoveries due to specific phage development. Such investigations underlie the phrase "other considerations," which perhaps escaped you, in the same paragraph.

This leads me to comment also upon the following remarks in your article:—

> "Only rigidly controlled parallel series of treated and non-treated cases will give information of real and lasting value," dysentery being "by no means always a serious and progressive malady." And again, "Since the evidence of the value of this treatment is anyhow not so convincing as to make it inhuman to withhold it from any sufferer, it would be a real service to therapeutics if those who, like Dr. Compton, have access to an unlimited number of cases of bacillary dysentery would treat alternate cases with the *bacteriophage* and the others by any one of the *approval methods* (italics mine), giving in each case a detailed bacteriological examination before and during treatment and chronicalling the clinical course. Only by such an investigation can the question be solved which ten years of scattered observation and uncontrolled reports, suggestive though they may be, have still left unanswered."

What does this mean? Are you here proposing saline treatment versus phage treatment alone or, on the other hand, serum treatment plus saline (a recognised approval method) versus phage alone? That the suggestion is for one of these methods is clear, I think, from your further remarks that in my cases:—

> "The ordinary saline treatment was carried on coincidently with the specific measures. Such a result, taken at its face value, appears to be excellent, but it is a constantly recurring lesson in medicine that face value results are not safe guides to the value of medicaments."

Let us consider the methods that at present hold the field. In the state of our knowledge to-day there appears to me to be fundamentally a choice of three: (1) saline alone; (2) antidysentery serum plus saline; (3) antidysentery bacteriophage plus saline. Saline I have included in all, because this is classical; and with reason; for, whatever lesions the microbes of bacillary dysentery may provoke, it is essential to combat the toxæmia of the disease resulting from the liberated bacterial endotoxins. That, I take it, is the chief raison d'être of sodium sulphate by mouth, or, in the graver cases, physiological saline subcutaneously. Concerning the first of these methods, saline treatment, as there is nothing specific about this, it is obvious that when "cure" results there is reason to suspect the intervention, as already suffi-

ciently insisted upon, of endogenous specific phage; d'Herelle has suggested that the origin of such phage may be symbiotically contaminated coliform bacilli. As concerns the second method, serum therapy, saline is always prescribed as a means of keeping the large bowel well flushed out and thus combating toxæmia. Yet does not the antiserum itself contain endotoxin neutralising antibodies? It is supposed to. Surely, then, if any specific treatment might lend itself to dispense with coincident saline treatment it would be this. But it does not. Why then, coming to the third method, should the patient not have the benefit of saline treatment also when phage therapy is adopted? Here I consider salines by mouth more than ever necessary, at least initially, because the attack of the phage on the offending bacilli means, theoretically at least, the liberation of endotoxin in relatively important amounts.

In view of all this, I am bound to consider your suggestion in regard to "controlled parallel series," treating "alternate cases with the bacteriophage and the others by any one of the approval methods," as entirely beside the point. Present-day knowledge in no way justifies such an experiment.

I am, Sir, yours faithfully,

Alexandria, August 23rd, 1929. A. COMPTON.

SUBJECTIVE PHENOMENA AND COLOUR VISION.

To the Editor of THE LANCET.

SIR,—All visual phenomena are subjective as is well realised by the physiologist and medical man. For instance, if all men and women were totally colour-blind there would be no such thing as colour or if everyone, like a percentage of men, saw only three colours in the spectrum red, green, and violet there would be no such colour as yellow. In a recent book a well-known physicist makes the following statement, "When we are dealing with something definite and tangible such as a colour," but a colour is not definite and tangible. Again, many physicists treat the old theories of colour vision as if they were demonstrations in mathematics—that is, any set of facts is put into mathematical form in correspondence with the theory. If another set of facts be taken an entirely different mathematical arrangement is given. Each mathematical arrangement may be correct but both cannot be true, any more than a man could have his left ear absent, deformed, and normal all at the same time.

The visual phenomena to be described are seen best as soon after awaking in the morning as possible. If the reader find that he cannot immediately see any of the phenomena described or even fail after repeated trials—though this is not at all likely—he should select one of the most intelligent men or women of his acquaintance, and having described the conditions of the experiment, without giving any clue to the phenomena to be observed, ask his friend what he sees in the requisite conditions. When his friend has described the phenomena which follow he will probably have no difficulty in seeing them himself. If on awaking in the morning the reader will look at a window or windows, preferably more than one, then immediately close his eyes and cover them with a pillow, he will see a very clear-cut positive after-image of the windows and adjacent wall. All the light parts will be light and the dark parts dark. If the eyes be kept quite still it will be noticed that the light parts gradually approach the centre of the field of vision and finally disappear with a movement exactly like that of a whirlpool. If, however, when the eyes have been covered they be moved rapidly from side to side the central dark parts of the after-image will be obliterated and the light parts form themselves into a light blur. Now this experiment is very significant, it proves conclusively that the photo-chemical stimulus in vision is movable in the retina. The cause of this movement is undoubtedly the contraction of the muscles of the eye causing unequal pressure on different portions of the retina.

Now observe the effect of moving material on the centre of the retina. On opening one eye on awaking in the morning and looking at the ceiling the central portion is seen as an irregular, circular, rhomboidal, or star-shaped black spot. On closing the eye again a bluish-violet circle appears at the periphery or middle of the field of vision, contracts, and then after breaking up into a star-shaped figure and becoming brighter disappears, to be followed by another contracting circle. If the eye be opened when the star figure has formed in the centre it will appear as a bright rose-coloured star, much brighter than any other part of the field of vision. If, however, we wait till the star has broken up and disappeared before opening the eye, it will be found that only a black spot is seen in the centre. Helmholtz, though he saw the foveal region, sometimes dark and sometimes bright, states that he was never able to reproduce the latter condition voluntarily though the above shows how it may be done, and that he could not explain the facts. This experiment shows conclusively that the foveal region is sensitised from the periphery.

Currents seen in the field of vision are not due to the circulation. These currents may be seen in numerous ways. The following is an easy method of seeing them. If one eye be partially covered with an opaque disc, whilst both eyes are directed forwards in a not too brightly illuminated room and special attention be paid to the covered eye an appearance of whirling currents will be seen with this eye. These currents appear to be directed towards the centre, and have a very similar appearance to a whirlpool. On closing both eyes all the portion in which the whirling currents are seen appears as dull purple. These currents cannot be due to blood-vessels, because we know that the centre of the retina, corresponding to the point where the greatest movement is seen, is free from vessels. The appearance is also very different from that of the movement of blood in vessels. The experiment succeeds best if the eyes have been previously exposed to a fairly bright light. An opaque disc in a spectacle frame suffices admirably, a certain amount of light being allowed to enter the eye from the periphery. Ferree[1] finds, and I agree with him, that the streams carry with them the visual quality, colour, and brightness of the background from which they come. Ferree considers that eye movement is the chief or sole factor in the formation and direction of these currents, but I see them quite clearly with my eye quite still, and the whirling in the centre is not appreciably different when the eye is moved from one point to another. The masterly paper by Ferree should be read by anyone interested in the subject of vision. The illustrations are very good.

Numerous other subjective phenomena have been described by me[2] and by Purkinje, and all the facts strongly support the theory of vision which I gave in 1889—namely, that the cones are the sole terminal perceptive elements, the rods being concerned with the formation and distribution of the visual purple. Apart from the numerous facts against the duplicity theory, which supposes that the rods are percipient elements for perception in a dim light, it will be found that it is supported almost entirely by misstatements—namely (1) that certain animals have only cones and others have only rods; (2) that the periphery of the retina is colour-blind; (3) that the eye is totally colour-blind in dark adaptation; (4) that the Purkinje phenomenon and the recurrent image are not found with the fovea.

With regard to these I offer the following criticisms. (1) Though I have examined numerous collections I have never been able to find any animal with only rods or only cones, neither have I found anyone who has seen such a retina. The tortoise is the most quoted; it is stated to have only cones. The rods and cones in the retina of the tortoise are as clearly defined and distinct as in the human retina.

[1] Amer. Jour. Psychol., 1908, 484.
[2] The Physiology of Vision, London, 1920.

(2) The periphery of the retina is not colour-blind, when colours of sufficient intensity are used. The reader can test this for himself with a doctor's red lamp. He will find he can see it as red to the extreme periphery.

(3) In dark adaptation the eye is not totally colour-blind. Further, there is no scotoma or blind area corresponding to the rod-free portion of the macula which is equal to a visual angle of about three degrees.

(4) The Purkinje phenomena and recurrent image are found with the fovea. Hess showed not only that the recurrent image was found with the fovea, but also that it was bent outwards at this region as it would be if the visual purple had to flow into the fovea. Helmholtz and Nagel stated that there was no evidence that the rods were percipient elements.

This letter summarises a communication read last July before the Association Française pour l'Avancement des Sciences at their Congress in Havre, and will, I hope, interest a medical audience.

I am, Sir, yours faithfully,

F. W. EDRIDGE-GREEN,

Special Examiner and Adviser to the Board of Trade on Colour Vision and Eyesight.

Willesden Green, August 12th, 1929.

DISINFECTANT PACKETS

To the Editor of THE LANCET.

SIR,—In the report of the meeting of the fourth Imperial Social Hygiene Congress in your issue of July 20th (p. 140) you quote Mrs. Rolfe as having given certain figures "for what they were worth." May I suggest that their value is not greater than zero? The statistical genius which sets five army corps with a gonorrhœal incidence-rate of 18·70 per 1000 as a control to five army corps with an incidence-rate of 10·92 per 1000 does not deserve to be noticed, and the phrase, "difference in favour of the men not provided with packets," whether yours or Mrs. Rolfe's, can be based on nothing but desire.

I am, Sir, yours faithfully,

J. ROSSLYN EARP.

Denver, Colorado, August 16th, 1929.

Obituary.

EDWARD ERSKINE HENDERSON, M.B. CAMB., F.R.C.S. ENG.

THE sudden death of Edward Henderson occurred while on a fishing holiday in Ireland. The eldest son of the late Dr. Edward Henderson of Shanghai, Edward Erskine Henderson was born in China in 1870. He was educated at Harrow, St. John's College, Cambridge, and Guy's Hospital. Having taken the M.B. in 1895, he was house surgeon at Guy's to Mr. Golding Bird, and obstetric assistant to Dr. Peter Horrocks. On leaving Guy's he married and went out to join his father's firm, but he did not stay long in the East. While there, he held the post of assistant surgeon to the Shanghai Hospital. He came home in 1898 and began working for the F.R.C.S. He was also enrolled as a student at Moorfields Hospital, working with Sir John Tweedy and Mr. William Lang, and later with Mr. Lang and Mr. Lawford. He was clinical assistant at Moorfields for 15 years. For many years he held the post of ophthalmic surgeon to the Queen Mary's Hospital for the East End and was at one time assistant surgeon to the South London Ophthalmic Hospital, but increasing deafness spoiled his chances of other appointments, and professionally he was best known as an efficient editor of ophthalmic journals. He joined the editorial staff of the *Ophthalmic Review* in 1909 and in the next year was chosen editor; he carried this journal through critical times until it was amalgamated with the Royal London Ophthalmic Hospital *Reports* and the *Ophthalmoscope* in the *British Journal of Ophthalmology* in 1917. He was sub-editor to the late Sydney Stephenson till 1923 and editor in-chief thence onward till his death. With Prof. E. H. Starling he was the author of a valuable research on the factors which determine the formation of the intraocular fluid; and he assisted the late R. H. Clarke in the latter's experimental work on the minute anatomy of the central nervous system.

Henderson was a most versatile man; his manipulative dexterity showed itself not only in operations but in the beautiful work in wood and ivory which he did on the lathe. He was a good sportsman in every sense of the word; a first-class shot with the pistol, he competed regularly at Bisley in the years before the war. He was well read, and disliked colloquialism and slang. His eldest son was killed in battle in 1918. Much sympathy will be felt with his widow and children in their bereavement.

RAPHAEL BELILIOS, M.D., F.R.C.S. EDIN.

THE death occurred on June 19th, at Shanghai, of Dr. Raphael Belilios, from complications following an operation for an acute appendicitis.

Born in 1873, Dr. Belilios was the elder son of the late A. R. Belilios, J.P., and received his medical education at Edinburgh, where he graduated M.B., Ch.B., in 1901. He later took the M.D. with honours and the D.T.M. (Lond.) and became F.R.C.S. Edin. After a short period of practice at Muswell Hill while continuing his special study of the eye, Dr. Belilios emigrated to Hong-Kong where he soon established a large general practice. He held appointments as lecturer and examiner in anatomy and physiology in the Hong-Kong School of Medicine. Deciding to devote himself entirely to ophthalmology, he moved to Shanghai in 1912 and became one of the foremost authorities on the eye in the Far East, his reputation extending to Europe. Patients from all parts of China came to Shanghai to consult him, while Eastern potentates sent escorts for him when they required his services. Dr. Belilios became lecturer and later professor of ophthalmology in the St. John's University of Shanghai and ophthalmic surgeon to St. Luke's Hospital. On the arrival of the British Defence Force in 1927 he was appointed consulting oculist to the corps.

Dr. B. H. S. Aylward, Port Health Officer, Woosing, Shanghai, writes: "I first met Belilios in 1897 at Edinburgh, when he was reading for his second professional, and we soon became close friends. He and his wife who survives him lived near to the Royal Infirmary, and many were the pleasant evenings his circle of close friends spent there. His wife was an accomplished musician, and used to encourage us in our attempts to sing grand opera. Belilios himself had a pleasant tenor voice. He was a keen fisherman, but his principal hobby was conjuring, at which he was expert; possibly the training of his hand by conjuring at Edinburgh had something to do with his dexterity as an operator. Belilios was the most generous of men, in word and deed. He was a brilliant worker and never lost his enthusiasm."

THOMAS WILLIAM BUCKLEY, M.D. DURH., M.R.C.S. ENG.

Dr. T. W. Buckley, who died on August 8th, was born at Betley, Staffs, in 1859. He received his medical education at St. Thomas's Hospital and Owens College, and qualified L.S.A. in 1882, and M.R.C.S. Eng. in 1883. He took the M.D. of Durham University in 1900. He acted for a time as assistant to his uncle, Dr. Thomas Morton, and later was assistant house surgeon at the Staffordshire County Infirmary and surgeon on one of the vessels of the Ocean S.S. Company. In 1888 he bought a practice at Thrapston, Northants, and in partnership with the late Dr. J. W. Gainer, worked over a huge rural district for 20 years. He was M.O.H. of the district and J.P. for Northamptonshire. On the outbreak of war, Dr. Buckley immediately volunteered for service abroad. Refused at first on account of his age, he received a commission in 1915, and was sent to a military hos-

pital at Shoreham. In 1915, having been promoted to the rank of major, he acted for a year as Assistant Commandant and Officer Commanding the R.A.M.C. detachment at Princess Christian Military Hospital, Englefield Green. In 1916 he was appointed to No. 2 Special Medical Board, Caxton Hall, ultimately becoming its President. The work was very heavy, involving visits of inspection to hospitals in and round London, and many hours of writing reports, as well as the routine work of the Board. Dr. Buckley was not demobilised till 1919, and never quite recovered from the strain of the war years. He spent the rest of his life very quietly in the little village of Clopton, a few miles from the centre of his old practice. Fond of reading and of country life, he was never at a loss for occupation. Dr. Buckley was modest about his own attainments, which were considerable. He had a keen sense of humour, and could tell many interesting stories of his experiences. He leaves a widow, son, and two daughters, one of the latter being a medical woman.

Medical News.

SOCIETY OF APOTHECARIES OF LONDON.—At recent examinations the following candidates satisfied the examiners in the undermentioned subjects :—

Surgery.—P. S. Balachandran, Middlesex Hosp.; K. C. Bhattacharyya, Calcutta and St. Thomas's Hosp.; A. Clark, Glasgow and London Hosp.; R. J. Kagan, St. Mary's Hosp.; N. H. Kettlewell, Bristol; J. M. Lees, Guy's Hosp.; J. E. Moody, St. Mary's Hosp.; C. Parthasarthe, Birmingham; A. Somerville, Sheffield; and A. W. B. Wiggins, Sheffield.

Medicine.—K. C. Bhattacharyya, Calcutta and St. Thomas's Hosp.; P. D. Kapur, Glasgow; N. H. Kettlewell, Bristol; H. H. Lakin, Birmingham and London Hosp.; J. M. Lees, Guy's Hosp.; A. Liberis, St. Bartholomew's Hosp.; W. McDermott, London Hosp.; R. Norrie, St. Andrew's; E. J. O'Loughlin, Birmingham; and A. W. Tam, Singapore.

Forensic Medicine.—K. C. Bhattacharyya, Calcutta and St. Thomas's Hosp.; W. T. Ellis, Charing Cross Hosp.; B. L. Fishout, Cardiff and Manchester; W. M. Hamer, Manchester and Charing Cross Hosp.; J. M. Lees, Guy's Hosp.; C. A. Munro, Glasgow; E. J. O'Loughlin, Birmingham; and S. Ramadas, St. George's Hosp.

Midwifery.—J. Britanischski, Berlin and London Hosp.; R. Gilmore, Manchester; W. St. A. Hendricks, St. Mary's Hosp.; C. Hortop and J. M. Lees, Guy's Hosp.; A. R. Madden, St. Mary's Hosp.; A. Somerville, Sheffield; and F. A. Yarde, St. Mary's Hosp.

The Diploma of the Society was granted to the following Candidates, entitling them to practise medicine, surgery, and midwifery: B. L. Fishout, N. H. Kettlewell, H. H. Lakin, J. M. Lees, C. Parthasarthe, and A. W. Tam.

INDUSTRIAL WELFARE SOCIETY.—At the tenth annual lecture conference to be held at Balliol College, Oxford, from Sept. 13th to 17th, the afternoon session on Monday will be devoted to industrial health. Dame Louise McIlroy will address a special session for women at which Dr. Margaret Hossell will preside, and Dr. D. A. Coles will take the chair at a special session for men on Health Problems in Industry. On the previous Sunday evening Mr. D. R. Wilson is lecturing on Fatigue Research and its Practical Application in the Factory.

ST. JOHN'S HOSPITAL FOR DISEASES OF THE SKIN.—This institution, which has its out-patient department in Leicester-square, and receives in-patients at 262, Uxbridge-road, last year treated 214 in-patients, whose average stay was 42 days, and 10,528 new out-patients. The annual report records that the receipts from donations fell by £400, following a fall of £600 in the previous year, and the Board of Management express "grave fears" for the future unless larger financial help is forthcoming. There were 2480 laboratory examinations and 875 patients were treated in the X ray department.

TRELOAR CRIPPLES' HOSPITAL.—The Alton hospital, founded by Sir William Treloar, comes of age this month, and there is to be a dinner at the London Mansion House on Oct. 22nd to celebrate the occasion. The opportunity will be taken to make an appeal for £100,000, the estimated cost of new buildings. The present buildings are the wooden structures of the Princess Louise Military Hospital, erected for the wounded in the South African war, and now worn out. The trustees find that the cost of repair and maintenance exceeds the interest on the cost of rebuilding. The hospital was originally designed for 200 patients; and to-day at Alton and Hayling Island the number of crippled children under treatment is 405.

SOCIETY FOR THE STUDY OF INEBRIETY.—The thirteenth Norman Kerr Memorial Lecture will be delivered by Sir Josiah Stamp, G.B.E., LL.D., D.Sc., on Tuesday, Oct. 8th, at 4 P.M., in the Great Hall of the B.M.A. House, Tavistock-Square, London, W.C.1., the subject being Alcohol as an Economic Factor.

CASTLEFORD, NORMANTON AND DISTRICT HOSPITAL.—On August 23rd Princess Mary opened this new hospital which has been built at a cost of £42,000.

HOSPITAL DINNERS.—The annual old students' dinner of St. Bartholomew's Hospital will be held in the Great Hall of the Hospital on Tuesday, Oct. 1st, at 7 for 7.30 P.M., Sir Frederick Andrewes in the chair.—The annual dinner of St. George's Hospital Medical School will take place on the same day, 7.15 for 7.45 P.M., at the Hyde Park Hotel, Knightsbridge, when Mr. D. Cotes-Preedy, K.C., will preside.

WESTMINSTER OPHTHALMIC HOSPITAL.—According to the annual report, the new hospital, which was opened exactly a year ago, "is far from being completely equipped, and is not yet in full working order." At the end of the year only 42 beds contained in two wards had been opened. Henceforward a much larger income will be needed to meet an expenditure which must necessarily increase considerably, and the committee appeal for a revenue of £20,000 a year.

YORKSHIRE HOSPITALS AND MOTORING ACCIDENTS. The *Yorkshire Evening Post* publishes the results of an inquiry into the cost and the degree of pressure upon the hospitals of that county caused by motoring accidents. In the first six months of the present year 560 victims of such casualties were treated at Leeds Infirmary, of whom 252 were admitted. They cost £1977, of which £176 was repaid by patients; £75 of this was a thank-offering from one patient. Last year Bradford Infirmary received £24 towards the £1174 spent upon 137 in- and 229 out-patients. In the year ended in April last some 600 cases were treated in the casualty ward of Hull Royal Infirmary, and 125 in-patients cost £924, of which £85 was repaid. The annual report of Doncaster Royal Infirmary states that last year 3898 casualty patients were treated, and that the wards are so constantly filled with motoring accident cases that it is impossible to deal with the long waiting list of local persons requiring operations.

METROPOLITAN DISTRICT NURSING ASSOCIATION.—This institution employs 19 trained nurses for the sick poor of Central London, who last year paid over 50,000 visits and, in addition, saw nearly 40,000 patients at clinics, dispensaries, and treatment centres in Westminster, Finsbury, Holborn, and St. Pancras. During the severe epidemic of measles in the spring 449 cases of that disease were referred to the Association, of which more than one-half had complications requiring skilled nursing; only five of these acute cases died. The 144 maternity cases all did well. The Association, which was founded by Florence Nightingale and others in 1875, last year spent £3456 of an income of £3939.

QUEEN CHARLOTTE'S MATERNITY HOSPITAL.—On Tuesday in last week the first sod was cut for the new buildings that are to be erected in Goldhawk-road, Hammersmith. Provision is being made for 358 beds, but the isolation block is to be erected first, with 30 beds for cases of puerperal sepsis, a disease for the investigation of which a special laboratory is being provided, with a staff of bacteriologists, doctors, and nurses placed in a house adapted for the purpose and connected by a covered way with the isolation block. Princess Mary is to lay the foundation-stone on Nov. 4th, but the removal from Marylebone-road will be gradual, since the present 80 beds will be more than quadrupled when the scheme is complete and the money available. The beginning is being made with the money raised by the National Mother-saving Campaign launched by the hospital two years ago. The site has some fine trees which, as far as possible, are being preserved.

DONATIONS AND BEQUESTS.—Dr. Robert Hamilton, of Leeds-road, Harrogate, left over £3000 to charities, including £250 each to the Bradford Royal Infirmary, the Bradford Children's Hospital, the Bradford Royal Eye and Ear Hospital, the District Nursing Association; and £200 each to Dr. Barnardo's Homes, the National Children's Institution, and the Bradford Institution for the Blind. The testator also gave £100 each to Harrogate Infirmary, Harrogate Hospital, Harrogate Home for Incurables, the Royal Medical College, Epsom, Victoria Children's Convalescent Fund, Royal Albert Asylum, Lancaster, and four other institutions.—Mr. Emile John Frank Hardenberg, M.R.C.S., L.R.C.P., of Frederick-road, Chingford, left £2500 to the London Orphan School, Watford, and £1000 to Guy's Hospital.

Appointments.

RICHMOND, HENRY, M.B. Birm., D.P.H., has been appointed Tuberculosis Officer for Wigan.

UNDERWOOD, E. A., M.B., Ch.B.Glasg., D.P.H., Deputy Medical Officer of Health for Rotherham.

Certifying Surgeons under the Factory and Workshop Acts: BOOTH, W. N., M.B., B.S.Durh. (Harlow and Parndon District of Essex); EVANS, J. P., L.R.C.P. Lond., M.R.C.S., (Colwyn Bay); and SUNDERLAND, E. B., L.R.C.P. Lond., M.R.C.S. (Haverill District of Suffolk).

Vacancies.

For further information refer to the advertisement columns.

Albert Dock Hospital, Connaught-road, E.—M.O. At rate of £110.
All Saints' Hospital, 91, Finchley-road, N.W.—Jun. H.S. Also Asst. H.S. At rate of £150 and £100 respectively.
Ancoats, Manchester, Crossley Maternity Hospital.—Half-time R.M.O. at rate of £50.
Ashton-under-Lyne District Infirmary.—H.S. At rate of £150.
Ayr County Hospital.—2 H.S.'s. Each at rate of £150.
Bangor, Carnarvonshire and Anglesey Infirmary.—H.S. £200.
Bath, Royal United Hospital.—H.S. At rate of £150.
Beckenham Urban District Council.—Part-time Asst. M.O. £325.
***Birkenhead General Hospital.*—Cas. S. £100.**
Birmingham and Midland Eye Hospital, Church-street.—H.S. £110.
Birmingham Ear and Throat Hospital.—Third H.S. At rate of £150.
Blackburn and East Lancashire Royal Infirmary.—Res. H.P. £150. Also 4th H.S. £130.
Bolingbroke Hospital, Wandsworth Common, S.W.—H.S. At rate of £120.
Bootle Borough Hospital, Derby-road.—Hon. Laryngologist and Aurist. Also Jun. M.O. At rate of £125.
Bradford Royal Eye and Ear Hospital.—Jun. H.S. £120.
Bristol General Hospital.—H.S. to Special Departments. At rate of £60.
Bournemouth, Royal Victoria and West Hants Hospital.—Two H.S.'s. Each at rate of £120.
Bury Infirmary.—H.S. At rate of £150.
Cambridge, Addenbrooke's Hospital.—Res. Anæsthetist. At rate of £180. Also H.P. and H.S. Each at rate of £130.
Cambridge, Papworth Village Settlement.—H.P. At rate of £100–£200.
Central London Throat, Nose, and Ear Hospital, Gray's Inn-road, W.C.—Hon. Chief Clinical Assts.
Chester, East Lancs. Tuberculosis Colony, Barrowmore Hall, Great Barrow.—Asst. M.O. £250.
Chichester, Royal West Sussex Hospital.—Hon. Asst. Orthopædic Surgeon.
City of London Maternity Hospital, City-road, E.C.—Asst. Res. M.O. At rate of £80.
Dreadnought Hospital, Greenwich.—H.P. and H.S. Each at rate of £110.
Eastbourne, Princess Alice Memorial Hospital.—Jun. H.S. At rate of £100.
East Ham Memorial Hospital, Shrewsbury-road, E.—Res. M.O. At rate of £200.
East London Hospital for Children, &c., Shadwell, E.—Res. Cas.O. At rate of £125.
Exeter, Royal Devon and Exeter Hospital.—H.P. Also Asst. H.S. At rate of £130 and £120 respectively.
Freemasons Hospital and Nursing Home, 237, Fulham-road, Chelsea, S.W.—Res. M.O. At rate of £250.
Great Yarmouth General Hospital.—Sen. H.S. £150.
Hospital for Sick Children, Great Ormond-street, W.C.—Asst. Path. and Research Fellow. £450. Also H.S. and H.P. Each at rate of £100.
Indian Research Fund Association, Simla.—Bacteriologist. Also Research Worker. Each Rs. 1500 per mensem.
Iraq Government.—M.O. Res. 1500 per mensem.
King's Lynn, West Norfolk and Lynn Hospital.—Sen. H. S. Also Jun. H. S. At rate of £150 and £100 respectively.
Leeds Hospital for Women.—Hon. Surgeon.
Leicester, North Evington Infirmary.—Res. M.O. £250.
London Lock Hospital, 91, Dean-street.W.—H.S. At rate of £200.
***Lowestoft and North Suffolk Hospital.*—H.S. £150.**
Manchester, Baguley Sanatorium.—Asst. M.O. £350.
Manchester, Monsall Hospital for Infectious Diseases.—Jun. M.O. £350.
Manchester Royal Eye Hospital.—Jun. H.S. £120.
Manchester, Salford Royal Hospital.—Two H.S.'s. Also Cas. H.S. Each at rate of £125.
Manchester Royal Infirmary.—Jun. Asst. M.O. for Radiological Dept. £350. Also 2nd Surg. Reg. £150.
Maidstone, Kent County Ophthalmic and Aural Hospital.—Aural H.S. At rate of £200.
Margate, Royal Sea Bathing Hospital.—H.S. At rate of £100.
Middlesex County Council.—Asst. County M.O.H. £750.
Miller General Hospital, Greenwich-road, S.E.—H.P. At rate of £125.
Northampton General Hospital.—H.P., H.S., and Asst. H.S. Each at rate of £150.
North Middlesex Hospital, Edmonton, N.—2nd Asst. S. £500.
Nottingham General Hospital.—H.P. Also 2nd Cas. O. Each at rate of £150.
Otago and Dunedin University Hospital, New Zealand.—Sen. Res. M.O. £500.
Princess Louise Kensington Hospital for Children, North Kensington.—Hon. Radiologist.
Queen Charlotte's Maternity Hospital, Marylebone-road, N.W.—Res. Anæsthetist. At rate of £80.
Radcliffe-on-Trent, Notts County Mental Hospital.—Jun. Asst. M.O. £350.
***Rotherham Hospital.*—H.S. £180.**
Royal Chest Hospital, City-road, E.C.—Res. M.O. At rate of £150 Also Out-patient M.O. and H.P. Each at rate of £100.
Royal National Orthopædic Hospital, 243, Great Portland-street, W.—H.S. £150.
Royal National Orthopædic Hospital, Country Branch, Middlesex—H.S. £150.
Southampton, Royal South Hants and Southampton Hospital.—Jun. H.S. Also Cas. O. At rate of £130 and £120 respectively.
Talgarth, Breconshire, South Wales Sanatorium.—Sen. Asst. M.O. £350.
Torquay, Torbay Hospital.—H.P. £175.
Walsall General Hospital.—Res. Surg. O. At rate of £200.
Watford, Herts, Peace Memorial Hospital.—Res. M.O. At rate of £150.
West London Hospital, Hammersmith.—One H.P.; two H.S.'s; one Aural and Ophthalmic H.S.'s; Res. Asst. Cas. O., Males; also Res. Asst. Surg.
Weston-super-Mare General Hospital.—Res. H.S. £130.

The Chief Inspector of Factories announces a vacant appointment for a Certifying Factory Surgeon at Tunbridge Wells (Kent).

Births, Marriages, and Deaths.

BIRTHS.

BRADFORD.—On August 28th, at Goodrington, South Devon, the wife of Ernest Cordley Bradford, M.A., M.B., B.Chir. Camb., of Laneside, Horsham, Sussex, of a son.

LEAKEY.—On August 21st, at Toro, Uganda, the wife of R. A. B. Leakey, L.R.C.P., L.R.C.S. Edin., L.R.F.P.S. Glasg., of a son.

OLDERSHAW.—On Sept. 3rd, at 18, Weymouth-street, Portland-place, W.1., to Olive, wife of Martin Oldershaw, M.D. Lond., F.R.C.S. Eng.—a son.

SAVEGE.—On August 24th, at a nursing home, Stonehaven N.B., the wife of Major J. M. Savege, R.A.M.C., M.B., Ch.B. Aberd., of a daughter.

MARRIAGES.

BARNES—BERTHON.—On August 28th, at the Subdeanery Church, Chichester, John Francis Lovel Barnes, M.R.C.S. Eng., L.R.C.P. Lond., of Thame, Oxon., to Anna Etheldreda Margaret, only daughter of the late Captain Leonard Berthon, 9th Royal Warwicks Regt., and Mrs. Berthon, of Selsey, Sussex.

MURRAY—THOMAS.—On August 27th, at Holy Trinity Church, Exmouth, John Douglas Ridout Murray, M.B., B.Chir., F.R.C.S., to Evelyn Leslie (Mollie), only daughter of Mr. and Mrs. Lewis Thomas, of Chessington, Exmouth.

TOWNEND—WEST.—On August 24th, at St. Peter's Church, South Croydon, Roy D. M. Townend, M.R.C.S. Eng., L.R.C.P. Lond., to Eleanor L. Clayton, M.R.C.S. Eng., L.R.C.P. Lond., only daughter of Mr. and Mrs. William West, of South Croydon.

DEATHS.

BELL.—On August 16th, quite suddenly, at his residence, Dogflud, Farnham, Surrey, Dr. William Ker Bell (Captain, R.A.M.C.), formerly of Shaldon, South Devon.

CAREY.—On August 19th, suddenly, at Church-square, Basingstoke, Frank Russell Carey, L.D.S. R.C.S. Eng.

HENDERSON.—On August 23rd, at Belleek, Ireland, Edward Erskine Henderson, M.B., B.Ch. Camb., F.R.C.S., of Thackham, Hartley Wintney, Hants.

KISCH.—On August 27th, at Westbourne-terrace, W., Albert Kisch, M.R.C.S. Eng., L.S.A., aged 86.

MACKINNON.—On Tuesday, August 20th, at Davaar, Cirencester, Charles MacKinnon, M.A., M.B., C.M., aged 71.

MORGAN.—On August 26th, Jerome William Morgan, L.R.C.P.I., L.R.C.S.I., L.M., Lieut.-Colonel, A.M.S. (retired), aged 85.

PATTERSON.—On August 31st, in London, Robert Lloyd Patterson, L.R.C.P., L.R.C.S. Edin., L.R.F.P.S. Glasg., of Castle-street, Hereford.

POWELL.—On August 31st, at Brighton, after an operation for appendicitis, Walter Erichsen Powell, M.R.C.S., L.R.C.P., aged 34.

WOOLLATT.—On August 13th, the result of an accident near St. Malo, Percy Charles Woollatt, M.D., F.R.C.S., aged 51

N.B.—A fee of 7s.6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

JEAN PAUL MARAT.

THE value of submitting persons famed in history to the illuminating scrutiny of trained psychologists is now accepted. Many facts which previously baffled the historian are thus made clear, and the true factors which underly the policies of princes, statesmen, and nations are brought to light. It does not follow that theories based on evidence surveyed at long range are necessarily correct, but that insight into the reason for abnormal conduct is more likely to be reached by those who have experience in assessing them. We welcome, therefore, a study of the life of Jean Paul Marat, from the standpoint of a psychiatrist physician. Dr. Charles W. Burr, of Philadelphia (Annals of Medical History, 1929). Marat was born in 1743 and murdered by Charlotte Corday in 1793 at the age of 50 years. Little is known about his family history, and our only picture of his childhood is painted in Marat's own reminiscences, which are histrionic and bombastic in the extreme. Marat, according to himself, was an ideal youth with a passion for fame, an exceptional education, and a horror of injustice and oppression. He describes himself as "reflective at fifteen and a thinker at twenty-one." Dr. Burr justly remarks that such sentences suggest the illusions of memory which are so pronounced a feature of paranoid personalities. About the age of 17 Marat left home with the idea of becoming a physician. He studied at Toulouse, Bordeaux, Paris, and London. In 1765 or thereabouts he started to practice medicine in Church-street, London, where he remained for about 12 years. In 1775 he was granted a medical doctorate by the University of St. Andrews. During his residence in London he commenced writing. Among his works were "An Essay on the Human Soul," the "Discoveries of M. Marat on Fire, Electricity and Light," and an "Essay on Gleets"—he claimed to be able to cure any case of gleet. In the "Essay on the Human Soul" Marat concludes that the meninges were the seat of the soul, and the organs of thought, memory, and will. A political book entitled the "Chains of Slavery" was published by him in 1774; in this work "the clandestine and villainous attempts of princes to ruin liberty are pointed out and the dreadful scenes of despotism disclosed." There was some difficulty in getting the book published, and Marat developed ideas of persecution and conspiracy for he decided that the English Government wished to prevent the circulation of the book. He therefore "disappeared" to Holland and turned up almost at once in the North of England, where he paid a round of visits to certain patriotic societies. The style in which this book is written, together with Marat's curious conduct certainly suggest paranoid trends of thought. The work abounds in phrases beloved of the eccentric demagogues who still flourish at the Marble Arch, and who declaim against tyranny, despotism, the sins of the rich, and the guilt of kings. It is probable that Marat's pages did receive some notice from authority, but there is no evidence to substantiate his fears of personal violence or the necessity for flight. Dr. Burr rightly insists that such beliefs and conduct suggest to a psychiatrist delusional ideas on the part of Marat.

Leaving England in 1777 Marat became physician to the Garde du Corps in the household of the Comte d'Artois. There followed a period in which he wrote much on scientific subjects. Dr. Burr tells us that none of these writings possess any particular merit, but Marat himself thought very highly of them. Again we have evidence of ideas of persecution. Marat felt that his work was decried by "envious cowards," and we hear of him proclaiming that the envious philosophers of France successfully prevented the publication of one of his works. From his post as physician to the Artois household Marat came to practice medicine in Paris, urged to do so, he tells us, "by the many sick persons who were despaired of by their physicians and to whom I had restored health." He boasts that his success was prodigious until he excited the envy of the doctors of the Faculty, who, he was convinced, held frequent meetings to consider the best means of slandering him and thus ruining his practice. Again the notion of persecution is followed by a change of occupation, this time to politics and to the editing of a paper, *The Friend of the People*.

There is no need to recite at length the political creed of Marat. The people in his view were those without property or occupation. They alone had the right to govern. His opponents were abused in his writings and speeches in scurrilous and offensive terms. During his last few years Marat led a life of seclusion, constantly fearing attack by his enemies, especially sudden death by assassination or poisoning. These fears were probably not without some justification, but he seems to have become obsessed with feelings of persecution, and lived preaching murder and anarchy as if every man's hand was against him. In 1790 he proposed to the Assembly that "eight hundred gibbets ought to be erected in the Tuileries to hang all traitors," and declared that 270,000 persons would have to suffer death in order to free France from her oppressors. It is of interest that for five or six years before his murder Marat suffered from a skin complaint which caused a painful pruritus. Dr. Burr quotes Dr. Graham Little as holding that the skin lesion was probably a dermatitis herpetiformis. It is known that the itching was relieved by sitting in a bath of hot water, and it was while in his bath that he was murdered.

Dr. Burr sums up the life of Marat as a slowly-growing insanity, in which delusions of suspicion and persecution were prominent from an early age. Towards the close of his years Marat conceived himself as a political genius, with intuitive powers and comprehension. His speeches and writings were prolific, and bear the stamp of egoism and grandiose self-satisfaction. There is much to be said for Dr. Burr's view that Marat was a paranoiac. He was undoubtedly a man of paranoid outlook on life, for he found persecution everywhere, and made the frequent changes of residence and occupation which are often associated with this type of personality. But it is nowhere suggested in Dr. Burr's review that Marat's insanity illustrates the fixed, organised, and systematised delusional state which makes up the paranoia of the text-book descriptions. All will agree to Marat's eccentricity, and to his occasional insane conduct and delusional ideas. There is no need to split hairs over Marat's clinical pigeon hole, but Dr. Burr does not solve the deeper personality problems raised by the life of this paranoid physician and revolutionist.

PAINFUL FIBROSITIC NODULES.

To the Editor of THE LANCET.

SIR,—Is there any satisfactory treatment for the nodules which persist after repeated attacks of fibrositis? My back muscles are studded with them, their cause having been abscessed teeth, long since removed. Most are painless, and beyond being centres of infection are of no account. But one, quite half an inch in length, is so placed in the right trapezius that lying on the right side causes pain which wakens at night, and without sleep a doctor cannot work. I have been at two spas, and the only treatment advised by the specialists, in addition to baths and the waters, has been heavy massage. This is painful and futile.

Can any of your readers report on some of the more modern methods. Is ionisation useful, or high frequency? Has X ray therapy been tried, or radium? I have seen radium dissolve a keloid. Might it not dissolve what is obviously a scar in the fibrous tissue of the muscle? Fibrositic nodules are extremely common. When the cause has been removed surely there must be some satisfactory method of treating them.

I am, Sir, yours faithfully,

August 20th, 1929. M.B., B.CH.

OPHTHALMOLOGY FOR THE LAYMAN.

THE object of a little book recently published[1] is to teach the layman something about the elementary anatomy and physiology of the eye and its more common diseases, in order that he may coöperate with the physician in matters of treatment. The method chosen is to devote separate chapters to the ailments incidental respectively to childhood, adult life, and advanced age, giving a brief summary of several diseases and their ordinary treatment in each chapter. Much of this matter could have been omitted without loss if greater stress had been laid on those symptoms which point to the necessity of expert advice. Among these are commencing squint in infants, the beginnings of myopia in school-children, headaches at all ages, and failing sight in adults, which may be due to the onset of cataract when delay is harmless, or to a chronic glaucoma when delay is dangerous, or may simply point to the need of glasses. As it stands the book is too much like a very elementary text-book and is not always accurate, for example, in the section on the anatomy and physiology of the retina. It would be better to omit those points which cannot be clearly explained and to concentrate on the subjects likely to prove of practical service. Even in its present form the book will meet the demand of those people who want to know something about the various diseases of the eye with which they are liable to be overtaken or of which they hear in relation to their friends. This demand is quite legitimate though its gratification may occasionally lead to uninstructed criticism rather than to coöperation with the family doctor.

[1] Your Eyes and Their Care. By Edgar S. Thomson, M.D., Surgeon-Director, Manhattan Eye, Ear and Throat Hospital, New York. New York and London: D. Appleton and Co. 1929. Pp. 175. 5s.

THE N.S.P.C.C.

IT comes as a shock to be reminded that 40 years ago no child in the home who had not reached the age of ten years was under the protection of the Crown, and that no one who wronged him could be brought into the presence of the law. It was not until 1889 that the Prevention of Cruelty to and Protection of Children Act was passed, and the Metropolitan and City Police authorities gave instruction that all cases of cruelty to children reported to them should be handed over to the National Society for the Prevention of Cruelty to Children to be dealt with by the Society. Since then much has been done for the emancipation of the child, but the forty-fifth annual report of the N.S.P.C.C. shows that much remains to do. In 1928–29 40,541 cases were reported, under the following headings: neglect and advice sought, 34,362; manslaughter, 1; abandonment, 78; exposure, 455; ill-treatment and assault, 3146; begging, 205; corruption of morals, 316; other wrongs, 1978. These figures show an excess of nearly 1000 cases over the previous year's total, but this is probably due to the wider response of the public to the Society's appeal that cases should be reported to it, and to a wider public knowledge of the Society's object in seeing that every child in the land shall live an endurable life. It is satisfactory to note that under the heading of "corruption of morals" the figures for 1928–29 show a reduction, though a small one, of 14 when compared with the figures for 1927–28. Increased confidence in the Society is shown by the fact that there is a notable increase in the number of instances in which parents have sought advice. In the report of the Medical Officer, Dr. L. D. Saunders, emphasis is laid upon the need for after-care where medical treatment has been found necessary. Four more inspectors have been added to the staff during the year. The Society's Central Offices are at Victory House, Leicester-square, London, W.C. 2.

THE TREATMENT OF ECZEMA.

IT is recognised that there are many factors which may help to produce the clinical manifestations called "eczema." They include, for instance, disturbances of the alimentary and endocrine functions, and metabolic disorders, such as gout, obesity, and hyperglycæmia. But the actual cause of the eruption is still obscure, and treatment remains correspondingly empirical.

Of the internal remedies at present in use C. Bruck[1] will find general agreement in condemning arsenic, except in such cases as are anæmic. A similar if less drastic criticism is applicable to yeast, ichthyol, and sulphur, although the waters of certain sulphur spas are sometimes valuable, possibly because of their relief of constipation and hepatic torpor, or by a tendency to counter acidosis. Following Kreibich's work on the nerve relationships of eczema, modern dermatology aims at reducing the excitability of the nervous paths, including the sympathetic, and often does this with some success by intravenous injection of sodium bromide, or, recently, by giving magnesium bromide intramuscularly. In this connexion Bruck finds the internal administration of antipyrin and pyramidon useful in acute cases, and he has observed that antipyrin ointments have a soothing effect locally, applied in 5–10 per cent. cum eucerin aqua base. Care must be taken not to apply this ointment over too large an area, although so far no ill-effects from absorption have been noted, even in children.

There is no specific dietary for eczema, but proper regulation of the intake in cases of obesity, gout, and hyperglycæmia is, of course, often beneficial. When the patient is undernourished, the cutaneous condition will sometimes improve if cream and butter in excess of the normal intake are added to the diet. Relative acidosis or alkalosis of the blood suggests possible lines of approach in the neurodermatitis type of eczematous manifestation, and in the exudative diathesis which is associated in some cases. Ehrmann claims successes for treatment of neurodermatitis by giving hydrochloric acid by mouth—a method based on his finding that a relatively large proportion of cases show hypochlorhydria. In children with the exudative diathesis and eczema Scheer recommends acidification of the milk, and good results are sometimes obtainable by adding a solution of 20 c.cm. acid. hydrochlor. dil. in 50–150 c.cm. of distilled water to half a litre of milk. The milk must be scalded and cooled before the weak acid solution is added. In cases of relative acidosis, in which the seborrhœic eczemata can be grouped, small doses of atophan followed by a mixture containing sod. bicar. and mag. carb. ust. seem to assist the local applications.

All in all the bulk of modern opinion favours the view that a combination of treatments gives better results than mere application of the well-tried ointments and lotions.

[1] Derm. Woch., 1929, p. 262.

APPETISING PREPARATIONS.

Messrs. Frank Cooper, Ltd., of Victoria Buildings, Oxford send samples of their "Oxford" marmalade, mint jelly, and horseradish cream. The marmalade, which is well known everywhere, was first made on a small scale from a domestic recipe and had its main consumption in Oxford, but for many years it has been manufactured on a commercial scale in response to wide demand. Made without any objectionable preservatives it has the Seville orange flavour. The firm send samples also of a mint jelly to be used as a substitute for mint sauce, and a horseradish cream made of freshly grown horseradish and real cream. These latter relishes to food are usually liked only by those who also have a very distinct idea of how they should be made, so that to hit off a popular taste will be something of a triumph.

THE "HYGIENIC" LECTURE BOARD.

Dr. S. T. Beggs, Medical Officer of Health for the Borough of Middleton, Manchester, has called our attention to the "Hygienic" Lecture Board, which is intended to take the place of the ordinary blackboard. The writing is done on a paper surface which is rolled up and down on, or from side to side of, the lecture board by means of a hand crank. Obviously this method of exhibiting diagrams and notes is more hygienic than that of the usual blackboard and chalk method, while much time is saved by reason of the fact that the diagrams can be permanently preserved and exhibited as required. The paper is written upon by special black or coloured crayons, which do not soil its surface when rolled and unrolled; it is supplied in lengths of 20 yards by 30 inches wide, on a cardboard tube, and the board can be illuminated by an electric bulb and reflector attached to a flexible arm. The apparatus can be fixed to a wall of the lecture room or used on a portable easel. The makers are Messrs. J. Halden and Co., Ltd., 8, Albert-square, Manchester.

AURAL DISEASE AND BATHING.

IN an annotation on this subject[1] a plugging material was referred to made of wool-fibre and plasticine which is sold by chemists as a satisfactory means of preventing the entry of water into the ear. Messrs. Frank Eyles of 8, Western-road, Brighton, Sussex, have sent us samples of ear plugs manufactured for this purpose, which are very carefully prepared by hand, the long fibred medicated cotton wool being thoroughly amalgamated with the plasticine in order to ensure that no disintegration of the plug occurs when it is being extracted from the ear The plugs serve a useful purpose.

THE PRE-SCHOOL CHILD.

THE thesis set out in a recent addition to the "To-day and to-morrow" series,[2] which already includes more than 80 volumes, is that, under present conditions, the home is not the ideal place, nor are parents the ideal people, for the major part of child-rearing. The smallness of the modern home and the absence of domestic help lead to a situation, especially after the arrival of the first-born, in which man and wife have to seek their pleasures separately, and family life is broken from the start. The effect on the child of limited space and lack of garden is a serious handicap to early activity. Allied to the problem of the cramped house or flat is that "special creation of the present age," the only child, a child upon whom the mother tends to lavish all the love which was meant to be shared by many, with the result that, in Mr. Lewis's telling phrase, "mother love becomes smother love." The solution proposed is an extension of nursery schools on a national scale for all classes. Mr. Lewis considers "that the nursery school is as essential to the mental slums of Golders Green as to the more material slums of Deptford." While lauding America for the enthusiasm with which she has set about providing for her pre-school children, he criticises the tendency to use nursery schools as research laboratories. There is no justification, he says, in creating the abnormal to study the abnormal, neither should the child be sacrificed to make a student's degree day. The book consists of five chapters and an introduction, such matters as play, discipline, and the duties of parenthood being dealt with in an unusually fresh and stimulating way. Mr. Lewis is happy alike in his matter and his manner, and has produced an informative and readable book.

The Deshell Laboratories, Ltd., manufacturers of Petrolagar, have changed the name of their company to Petrolagar Laboratories, Ltd., but have not changed their management or address.

[1] THE LANCET, July 27th, p. 182.

[2] Romulus or the Future of the Child. By Robert T. Lewis, B.A. London: Kegan, Paul, Trench, Trübner and Co., Ltd., 1929. Pp. 95. 2s. 6d.

A Contribution
TO THE STUDY OF THE MATERNAL DEATH-RATE.

BY G. F. GIBBERD, M.S. LOND., F.R.C.S. ENG.,
OBSTETRIC REGISTRAR, GUY'S HOSPITAL.

THIS study is based on a comparison of the midwifery in the Guy's Hospital Maternity District as it is to-day and as it was 60 years ago. We know fairly accurately how midwifery was done at Guy's in the days of Galabin and Braxton Hicks. We know how much (or how little) attention was then paid to the prevention of sepsis. We know that there was never any antenatal work. We are fortunate in having an accurate and detailed analysis of the cases that were delivered under these conditions, with a full account of the results obtained. By comparing these results with those of the present day upon a similar group of patients, living under similar conditions, in roughly the same area, and knowing accurately, as we do, the modern methods in use, we may get some valuable information as to how far recent changes in practice have benefited the modern mother. Further, we may discover the faults still to be remedied in our efforts to reduce the present mortality-rate.

MIDWIFERY AT GUY'S IN 1870.

The following account is copied from the report by Galabin published in Guy's Hospital Reports in 1876.[1]

> The district . . . lies within a radius of about a mile from the hospital, and patients are attended at their own homes by the students. A certain number of these, who have already attended a course of lectures on midwifery, are appointed extern obstetric attendants for each month. They reside close to the hospital, and are expected to abstain from visiting the post-mortem and dissecting rooms while they are attending midwifery cases. Two senior students, who have obtained a legal qualification to practise, are appointed resident obstetric assistants and hold office each for one month as junior and one month as senior. They live within the walls of the hospital, and are ready at all times to assist the junior students. The assistant obstetric physician is sent for to superintend all cases in which any obstetric operation is performed.

In the 12 years from October, 1863, to September, 1875, the total number of women delivered was 23,591. There were 106 fatal cases, giving a maternal mortality-rate of 4·4 per 1000. If this figure is compared with the present-day mortality-rate for the country as a whole, we might conclude that the "advances" in midwifery during recent years have led to no decrease in the dangers associated with childbirth. But such a conclusion is not necessarily true, since the comparison is unfair. A much more comparable series is that of the 21,423 "district" cases delivered in the ten years 1919 to 1928 inclusive. This number includes all cases domiciled in the Guy's Hospital district and delivered by the hospital, whether the actual delivery took place in the patient's own home or in hospital. It is difficult to obtain figures of an average practice carried out by a hospital service, since if only patients delivered on the district are considered there will be an unduly low incidence of abnormalities, because the majority of difficult cases will not be delivered in their own homes. If, on the other hand, only patients delivered in hospital are considered, there will, of course, be an undue proportion of difficult cases. By grouping patients according to the area in which they are ordinarily resident we can to some extent eliminate selection. Since the Guy's Hospital district is comparatively small and served by the hospital largely to the exclusion of other practitioners and institutions, these 21,423 district cases can be taken as a fairly representative sample of the general population, in which factors tending to selection have been to a great extent overcome. The only patients excluded are those who were ordinarily resident outside the geographical area of the maternity district.

The 21,423 cases under consideration therefore form a group of average women, as nearly as possible comparable to the group of 23,591 women delivered between 1863 and 1875. In this group (1919–18) there were 22 maternal deaths, giving a maternal mortality-rate of 1·03 per 1000. Thus the maternal mortality-rate in the practice of the Guy's Hospital maternity district during the past ten years is about one-quarter what it was 60 years ago, and this in spite of the fact that obstetric interference is now very much more common. Unfortunately there are no detailed analyses available for recent years before 1928 of the various obstetric abnormalities and operations, but the practice in the Guy's Hospital maternity district has changed but little in the last ten years, and an analysis of the 1679 cases delivered in 1928 may be taken as representing fairly accurately the methods in use during the 1919–28 period.

OBSTETRIC INTERFERENCE.

The following table shows how much more frequently major obstetric interference is resorted to now than it was 60 years ago. The figures for the 1863–75 period have been compiled from Galabin's report published in 1876.[1] The figures for 1928 have been obtained from the Report of the Maternity Department of Guy's Hospital for 1928.[2]

Table I. shows the percentage of cases in which interference was resorted to.

TABLE I.

Nature of operation.	12 years 1863–1875.	Year 1928.
	Per cent.	Per cent.
Forceps	0·51	4·5
Version	0·45	0·3
Craniotomy	0·07	0·18
Cæsarean section	Nil.	1·3
Manual removal of placenta ..	0·32	0·18
Instrumental induction of labour	Nil.	2·4
Total obstetric interference ..	1·35	8·86

It is very unlikely that the enormous increase in obstetric interference can be due to any comparable increase in the incidence of obstetric abnormalities. The only possible explanation for the striking difference is that to-day interference is considered proper where formerly it was not. In 1928 the proportion of Cæsarean sections to total deliveries was as great as the proportion of all obstetric operations to total deliveries 60 years ago; in spite of this craniotomy was performed twice as frequently in 1928 as in the former period. Moreover, the forceps rate is now nearly ten times what it was in 1870, and version (which in the days of Galabin and Braxton Hicks was a relatively common method of delivery in difficult cases) is only slightly less common in the present day practice of Guy's Hospital.

What is the meaning of this change in our methods? It is sometimes explained on the grounds of modern impatience and meddlesomeness. If only the obstetrician, it is sometimes said, would exercise his patience more and his art less, natural delivery would be a much more common event, and natural delivery must be the best thing for the patient. This line of reasoning generally concludes with the aphorism that the best way to reduce the frequency of the tragedies of labour is to leave to Nature what Nature ordained. Such an argument has been used so often, and when applied to indiscriminate interference is so obviously true that we must not be carried away by its extreme application. To say feebly that we are not impatient and meddlesome is an assertion that we cannot expect to be accepted without proof; but, in so far as such a thing is capable of proof, we have some statistical

[1] Report of Guy's Hospital Lying-In Charity, Guy's Hospital Reports, 1876, xxi. (3rd Series), 265.

[2] Clinical Report of Maternity Department, ibid., 1929, lxxix. 277.

evidence in a comparison of the frequency with which the placenta was removed manually. This operation is sometimes, but only rarely, an absolute necessity, and the frequency with which it is performed may be to some extent an index of the impatience and meddlesomeness of the obstetrician, since it is not performed out of consideration for any physical suffering on the part of the patient. In 1870, during a time when interference generally was far less frequent than it is to-day, the placenta was removed manually almost twice as often as it is to-day. This at least suggests that midwifery now is conducted with no less patience than it was 60 years ago.

There can therefore be only one explanation for the increase in obstetric interference, and that is that our standards of what we regard as "tolerable suffering" have changed since Galabin's time. This is a natural consequence of changes in social conditions in the same period. These two changes go hand in hand, and to condemn the one as a curse, while accepting the other as a blessing, is merely a peevish outcry against the inevitable. The increase in obstetric interference has come to stay, just as our improvements in the standard of living have come to stay, and any attempt to tackle the problem of maternal mortality by "back to Nature" methods is doomed to fail at its very inception—doomed by the impossibility of forcing it upon our patients, rather than by any unwillingness on the part of the accoucheur. Even if it could be adopted it still remains to be shown that it would result in any reduction in the mortality-rate. The figures quoted show that in multiplying the frequency of interference by six, we have divided the maternal death-rate by four, but it does not follow that by doubling the present interference rate we should again halve the mortality-rate. We must find the amount of interference that will give the minimum mortality. The general outcry against obstetric interference is certainly justified when that interference is excessive, but we must not expect—indeed we cannot wish—that it should be so seldom resorted to as it was 60 years ago. The solution to the problem of maternal mortality will not come from drastic changes in the accepted modern technique of conducting labour. Indeed, the present technique and the present-day willingness to interfere are the result of true advances in the practice of obstetrics, a response to the demands of women to be relieved of some of the intolerable suffering to which they were submitted three generations ago. With them come, not an increased mortality, but a death-rate reduced to one-quarter of the original figure.

Avoidable Complications.

The part played by antenatal work in reducing the mortality is difficult to assess, but an index of its value can be obtained by comparing, in the two series, the number of deaths which follow complications that can be avoided by efficient antenatal work. The most important are: (*a*) disproportion, (*b*) malpresentation, (*c*) toxæmias of pregnancy, and (*d*) serious intercurrent diseases. The deaths ultimately due to these causes have been set out in Table II.

Disproportion is now responsible for far less deaths than formerly, and this improvement must be due, in part at least, to the fact that antenatal supervision has forewarned us and enabled us to deal more safely with such cases. Part of the improvement is, of course, due to improved technique—for example, the substitution of Cæsarean section for a difficult craniotomy—but even so, Cæsarean section is safe only in so far as it has been foreseen at the antenatal clinic and performed before it has become a dangerous operation late in labour. Malpresentation was ultimately responsible for only about half as many maternal deaths as it was 60 years ago, and here again antenatal care must be held responsible for the improvement. Comparative figures on the toxæmias of pregnancy are notoriously fallacious, since the frequency and severity of eclampsia seems to vary within wide limits in different places, and also possibly in different periods, but in spite of this the reduction in the death-rate from eclampsia in the more recent series is probably significant, and can be taken as still further proof of the value of antenatal work. Apart from fulminating cases, which sometimes occur quite soon after examination has revealed a normal blood pressure and urine, there is no doubt that antenatal care, if efficiently carried out, can greatly reduce the incidence of eclampsia.

TABLE II.—*Death-rates per 1000 Deliveries in Cases of Disproportion, Malpresentation, Toxæmia, and Intercurrent Disease.*

1863–1875 (23,591 cases).		1919–1928 (21,423 cases).	
Disproportion—		Disproportion—	
Forceps	5	Cæsarean section	3
Version	2	Craniotomy ..	1
Craniotomy ..	6		4 = 0·19*
Ruptured uterus	5		
	18 = 0·76*		
Malpresentation—		Malpresentation—	
Version	1	Ruptured uterus	1 = 0·046*
Ruptured uterus	1		
	2 = 0·08*		
Eclampsia	7 = 0·29*	Eclampsia	1
		Other toxæmias ..	2
			3 = 0·14*
Intercurrent diseases—		Intercurrent diseases—	
Phthisis	1	Phthisis	1
Heart disease ..	5	Heart disease ..	3
Tumour of brain	1	Hyperthyroidism	1
Purpura	1		
	8 = 0·32*		5 = 0·24*

* Per 1000.

There can be no doubt that the care of the general health during pregnancy forms a very important part of antenatal supervision, and although no very great decrease in the number of deaths from intercurrent disease can be demonstrated in these series, the benefits of antenatal care in this direction are probably far greater than analysis seems to suggest. The fact remains, however, that where pregnancy complicates, or is complicated by, some serious intercurrent disease which of itself is likely to cause death, antenatal care has not been rewarded by any very great decrease in the death-rate.

Sepsis.

The part played in the reduction of maternal mortality by changes in our outlook on sepsis during the last 60 years is well brought out in Table III.

TABLE III.—*Death-rates per 1000 Deliveries from Sepsis.*

1863–1875 (23,591 cases).		1919–1928 (21,423 cases).	
Sepsis following normal labour	26	Sepsis following normal labour	1 = 0·046*
Sepsis following P.P.H.	6		
	32 = 1·31*		
Sepsis following obstetric operations—		Sepsis following obstetric operations—	
Version, malpresentation ..	3	Cæsarean section	2 = 0·09*
Version, placenta prævia	1		
Forceps	1		
Craniotomy ..	3		
Manual removal of placenta ..	2		
	10 = 0·42*		
Total deaths from sepsis ..	42 = 1·73*		3 = 0·14*

* Per 1000.

In studying the death-rate from sepsis it is important to distinguish between spontaneous deliveries in which sepsis supervened and cases where the infection

followed major obstetric interference. The factors contributing to infection in these two groups are probably different, and an estimate of the efficacy with which the various factors have been dealt during recent years can best be obtained by considering each group separately.

In natural delivery, trauma and perhaps also direct inoculation by the hands of the attendant are probably not the most important factors predisposing to the sepsis. If we try to find some explanation for the fact that the death-rate from sepsis following natural delivery was 30 times as great in the 1863–75 series as in the 1919–28 series, we are tempted to attribute it to more efficient prevention of cross infection in recent years. In the present practice of Guy's Hospital, isolation of "district" cases is comparatively easy, since patients with pyrexia are effectively isolated in their own homes and, if admission to hospital is thought necessary, the patient is taken into the septic ward, which is situated in a block of buildings far removed from the maternity ward. The student who has delivered such a patient is easily suspended from duty if necessary and has not, as a rule, been in contact with more than one or two patients before his case of sepsis has become manifest. Thus, except for these one or two contacts, isolation is efficient even before the first manifestation of sepsis. The danger of cross infection is, however, less easily dealt with among ward cases, but here again it is only very rarely that an infected case—i.e., a patient in whom repeated attempts at delivery have been made outside the hospital—is admitted. Such a patient is potentially infected and is therefore a potential danger to all the other patients in the hospital ward, and the danger is all the more insidious in that she may show no signs of her infection until a day or two after she has mixed with other patients in the ward. At Guy's Hospital the majority of patients who live outside the "district" and who are delivered in the hospital have been looked after during pregnancy by the hospital. Emergencies from outside practitioners are seldom admitted. This limitation of the hospital service is more than compensated for by the relative freedom from serious sepsis in the maternity ward.

The attitude taken towards isolation 60 years ago can be judged from the following extract from Galabin's report of 1876.

> . . . it is satisfactory to record that there is no instance in which contagion seemed to have been communicated by the attendant from one patient to another. It is usual to suspend an extern from his duties for a few days if symptoms occur in any patient attended by him which are thought to indicate any special risk of infection. In the case of the resident obstetric assistants, who are not generally in such close attendance upon the patients, reliance is placed upon antiseptic ablutions and change of clothing. The nearest approach to an epidemic was in November and December, 1874, when there were four deaths from puerperal septicæmia among patients delivered within four weeks. All four, however, were attended by different gentlemen, and no communication whatever could be traced between them.

It is seen that the precautions then, although not so strict as those of to-day, were nevertheless on the same general lines. It is true that nowadays four deaths from septicæmia in four weeks would be regarded as more than an "approach to an epidemic," and the more searching inquiries that would be made to-day would probably have revealed some common contact. But the extract from Galabin's report is quoted to show that he was fully alive to the importance of the principle of isolation, and we must assume that his ideas were as faithfully carried out as are similar (though more stringent) ideas to-day. Thus, while there has been an enormous decrease since 1870 in the number of deaths from sepsis following natural delivery, it is difficult to attribute all this improvement to more efficient isolation of contacts, since the broad principles of isolation were enforced 60 years ago. The influence of trauma and of gross contamination at the time of delivery should not be very different in the two series, since we are dealing only with natural deliveries.

The one factor that is different in the two series is the general condition of the mother. With antenatal care, as a rule, the general health of the average mother is probably far better to-day than it was in Galabin's time. The opportunities that we now have of ensuring proper and sufficient food and adequate general treatment are far greater than in former years. Furthermore, in Galabin's report a delivery is classed as natural so long as it was not effected by version, forceps, or craniotomy, and many cases under this heading must have been exhausted by a labour so prolonged as to leave the patient quite unfit to deal with an infection even of low virulence. It has already been pointed out that the forceps rate is now ten times what it was 60 years ago and, so far from causing an increased death-rate from sepsis, it seems quite likely that this very interference is responsible for the decrease, because it has saved many women from the exhaustion that would have followed a more prolonged labour ending in a "natural" delivery. Increased obstetric interference carried out with proper regard to the principles of asepsis and antisepsis may be regarded as a large factor in the reduction of the septic death-rate in the 1919–28 series.

The relative safety attendant upon present-day obstetric interference is further borne out by reference to the septic deaths in cases where the delivery was not spontaneous. In spite of the increased frequency of interference in the 1919–28 series there was a very great reduction in the deaths in this group. This improvement is partly due to the fact that severe trauma after obstetric operations is far less common to-day than formerly, since difficult craniotomies and high forceps deliveries are avoided wherever possible by the induction of premature labour or by Cæsarean section. The greatest factor, however, in rendering obstetric interference relatively safe must be the changes in operative technique. In the light of the results recorded here it would seem safe to conclude that so long as the facilities for good aseptic and antiseptic technique are available and are fully used, the modern tendency to increase the amount of obstetric interference is not merely justifiable but definitely beneficial.

Antepartum and Postpartum Hæmorrhage.

Modern practice has carried with it practically no decrease in the death-rate from accidental hæmorrhage. In all the fatal cases in the 1919–28 series (Table IV.) the hæmorrhage was of the concealed type. Three of the patients were delivered by Cæsarean section, and in one the condition was treated by plugging the vagina.

Table IV.—*Death-rates per 1000 Deliveries in Cases of Antepartum Hæmorrhage.*

—	1863–1875 (23,591 cases).	1919–1928 (21,423 cases).
Accidental hæmorrhage	5 = 0·21 per 1000	4 = 0·19 per 1000
Placenta prævia . .	6 = 0·25 ,,	2 = 0·09 ,,

The relatively large number of deaths from this cause may be taken as an indictment against the method of treatment adopted at Guy's Hospital, and, although no fixed line of treatment can be said to be practised, Cæsarean section has been performed frequently in the more serious cases of concealed accidental hæmorrhage during recent years. This can hardly, however, be held responsible for the unfortunate results, since they were roughly the same in Galabin's series, in which more conservative measures were invariably taken. The difficulty is that the fatal result is frequently due to an associated toxæmia of great severity and often of sudden onset. The modern methods of treating blood loss by transfusion are so effective that it is disappointing to find no improvement where these methods have been employed. The reason is probably that patients with concealed accidental hæmorrhage die nowadays not so much from hæmorrhage (which can be treated

effectively) as from profound toxæmia. This belief is born out by clinical experience and by post-mortem findings.

The death-rate from placenta prævia shows a definite improvement in the recent series. This is partly due to the fact that antenatal supervision has at times enabled us to detect, or at least to suspect, the condition before the patient has been weakened by a serious hæmorrhage, but most of the improvement is probably attributable to our improved methods of combating blood loss.

Postpartum hæmorrhage now very rarely causes death, as is shown in Table V.

TABLE V.—*Death-rate per 1000 Deliveries from Postpartum Hæmorrhage.*

1863–1875 (23,591 cases).	
Postpartum hæmorrhage	12
Syncope after slight hæmorrhage	1
Inversion of uterus with hæmorrhage ..	1
Total	14 = 0·59 per 1000
1919–1928 (21,423 cases).	
Spontaneous rupture of uterus with hæmorrhage	1
Inversion of uterus with hæmorrhage ..	1
Total	2 = 0·09 per 1000

This very striking improvement affords still further evidence of the valuable help given by modern methods of treating hæmorrhage.

CONCLUSIONS.

Two series of cases have been compared with reference to the maternal mortality-rate. The difference between the two series is mainly that the one is an example of midwifery practice 60 years ago, and the other of modern practice. In all other respects the two groups are as nearly as possible identical, and any differences between them are to be attributed to inevitable changes in social conditions. By limiting the cases to patients domiciled in a compact "district," the distortion usually present in "in-patient" figures has been eliminated, and by including all cases who, though domiciled in the "district," were nevertheless delivered in hospital, the distortion usually present in "out-patient" figures has also been avoided. The series can, therefore, be regarded as a fair average sample of the general population, at least among the particular social class exemplified by the residents in the Guy's Hospital "district."

The maternal mortality-rate in the last 60 years has fallen from 4·4 per 1000 to 1·03 per 1000, and this improvement can be traced directly to changes in obstetric methods. These changes in practice have resulted in an increase in the amount of interference, but even so the total interference rate at the present time is less than 9 per cent. It is contended that the increased interference up to this point is justified by the results obtained and that it may be an important factor in diminishing the death-rate by eliminating those cases of profound obstetric exhaustion that must have occurred 60 years ago. It is to our improved aseptic and antiseptic technique that we must attribute the fact that, in spite of the much greater frequency of interference, the danger of subsequent sepsis has been very much reduced. Amongst cases of spontaneous labour the conscientious use of a simple antiseptic technique and strict attention to the principles of isolation have practically abolished sepsis as a cause of death.

Antenatal care has shown its value most dramatically in reducing the death-rate in cases of disproportion and malpresentation, and also in making eclampsia a rare disease. But it has done more than this: it has given us the opportunity to look after the general health of the patient during pregnancy so that she is better able to face the risks of labour and the puerperium.

The use of intravenous saline or gum saline or of blood transfusion has contributed largely to the reduction in the death-rate from postpartum hæmorrhage and placenta prævia, but concealed accidental hæmorrhage accounts for practically as many deaths as it did in former years, and the cause of death in these cases seems to be a profound toxæmia which we cannot treat. In spite of the enormous amount of study that has been spent on the toxæmias of pregnancy since Galabin's time our treatment for this condition, once it has developed (whether in association with accidental hæmorrhage or as eclampsia), is as ineffective as ever it was. Apart from the experience gained from periodical swings of the pendulum from radical to conservative lines of treatment we have nothing of fundamental importance to add to the treatment of 60 years ago. We have succeeded in preventing eclampsia to a great extent, but we must not therefore imagine that we have advanced in our treatment of the condition once it has arisen. Under present conditions of practice an occasional case of fulminating eclampsia or of concealed accidental hæmorrhage will occur in spite of reasonable antenatal care, and it is in the treatment of such cases that modern methods have proved so disappointing. To prevent a disease is certainly better than to treat it, but until we can prevent every case of severe toxæmia there is still a real need for efficient treatment.

The death-rate from intercurrent diseases was 0·32 per 1000 in the 1863–75 series, and 0·24 per 1000 in the 1919–28 series, showing that antenatal care has been unable greatly to benefit the pregnant woman who is already seriously ill with some other disease. This is to be expected, since in these cases we cannot look upon childbearing as anything more than a contributory factor in causing death, and we cannot expect antenatal treatment to cure the primary disease. The close approximation of the figures in the two groups is interesting in view of the question of the reliability of national mortality figures. How far do such figures include deaths from intercurrent disease? It is suggested that 0·3 per 1000 may be taken as a true measure of the deaths from non-obstetrical causes in an average unselected practice, and if this is so it is obvious that these cases become a serious factor only when the total mortality-rate is very low.

Investigations

INTO THE

BLASTOGENIC PRINCIPLE IN FOWL SARCOMA,

AND THEIR SIGNIFICANCE IN THE THEORY OF THE ORIGIN OF MALIGNANT TUMOURS.

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BETWEEN 1926 and 1929 I published a series of papers [1] [2] [3] describing some investigations on Peyton Rous's fowl sarcoma These were undertaken with the support of the German Central Committee for Cancer Research and the Fund in Aid of German Science.* My first investigations were based on the work of Gye and Barnard [4] [6] whose technique I learned in London, and on the assumption of Rous and Murphy [5] that these tumours are caused by a filtrable virus. The Rous fowl sarcoma is now admitted to be a true malignant tumour both morphologically and pathologically. As is well known, it differs from other malignant tumours since it is possible to produce tumours of the same kind in healthy fowls by means of filtrates alone, without the inoculation of cells. A

* I am particularly indebted to Prof. M. Busch of the State Department of Health, who supervised the pathological and anatomical part of the work and prepared microscopic and macroscopic sections.

single injection of 1·0 c.cm. of a sterile and cell-free Berkefeld filtrate into the pectoral muscle of a healthy fowl produces tumours which appear microscopically to be true tumours; they infiltrate the healthy tissue without causing any great inflammatory reaction, and give rise to typical metastases in other organs, such as the lungs, liver, and heart.

The fact that the filtrate now and again contains a cell has recently been made by Teutschländer, Nakahara, and other authors[8 9] a reason for believing that the tumours might be caused by isolated cells or parts of cells injected with the filtrate. I have succeeded, however, in proving that tumours can be evoked by the injection of counted cell suspensions containing a relatively large number of cells, but not by suspensions containing a small number. When a suspension containing only a few cells (for example 4000–10,000) is injected into the breast of a fowl on both sides, on one side by itself and on the other with an unheated cell-free filtrate or one that has been heated to 50° C. for a quarter of an hour, a tumour appears only on the side on which the filtrate was injected. The same result followed the injection of the filtrate without the suspension. This proves that the tumour could not have been produced by isolated cells in the filtrate.

I arrived at the same conclusion as a result of some experiments which I undertook to see whether tumours could be produced by injecting the blood, spleen, and egg-yolk of tumour-bearing birds, in many of which there was no histological evidence of metastasis in the organ from which the injected substance was taken, or indeed in any part of the body. My findings agree with those of Rous and Murphy, Bürger, Busch, Pentimalli,[10] Llambias and Brachetto Brian.

I have also investigated the question of whether or not Gye and Barnard are right in assuming that the cause of the Rous sarcoma is an unspecific "virus," together with a chemical "specific factor." The results which I obtained agree with those of Harkins, Schamberg, Kollmer, Kast, Flu, Sternberg, and others, and show that the "specific factor," a chloroform-killed filtrate, is alone responsible. The various attempts which have been made to cultivate the virus, with all kinds of aerobic and anaerobic cultures, have been uniformly unsuccessful. Nevertheless, a Rous tumour has twice been produced with suspensions cultivated in bouillon at 37° C. and then rapidly centrifuged, even in weak dilution. This dilution contained some ordinary Gram-positive rod-shaped organisms which I believe to have adsorbed the activating principle of the tumour into their outer surfaces. Fujinami and Inamoto report a similar observation in which the organisms were staphylococci, and which is especially interesting in view of the occasional success of Blumenthal and his colleagues in cultivating tumour-activating microbes from human cancers.

Chemical Experiments.

After my failure to cultivate the virus I turned my attention more along chemical lines. It is possible by precipitating the euglobulin with carbon dioxide to divide the diluted filtrate into two fractions. By analogy with complement-splitting, I describe the one as the euglobulin fraction, and the other, less accurately, as the albumin fraction. I obtained four positive results with the globulin fractions of various filtrates, and only two with the albumin. Baker and McIntosh, Harde,[11] Sugiura,[12] and Benedict have also worked along these lines, have established that the pH value of the agent never rises above 10·0 nor falls below 3·8, that acid filtrates are less effective than alkaline, and that the time taken by a filtrate to act depends upon the quantity of the agent present. Trypsin stimulated growth (Baker and McIntosh), a fact which suggests that fermentative processes underlie the generation of Rous sarcoma. Sugiura and Benedict, who precipitated the globulin with ammonium sulphate, could produce tumours only with the globulin fraction, and found practically all the nitrogen content of the filtrate in the precipitated globulin. In conformity with Teutschlander and the other workers quoted, we found that 50°–52° C. was the critical temperature for the efficiency of the filtrate, and also that the time factor and the efficacy of the injected substance depended very largely upon its quantity. I therefore proceeded systematically to investigate the fermentative nature and chemico-physical properties of the "agent," and to test for it and demonstrate its existence by the current methods. The carbon dioxide introduced to precipitate the globulin had already been proved innocuous, and it was now demonstrated that a tumour could be produced after chlorine had been passed through the filtrate. Seven filtrates through which hydrogen had been passed and eight through which oxygen had been passed yielded three and one positive results respectively on inoculation. The fact that it was more effective under anaerobic than aerobic conditions showed in this respect a close analogy to Warburg's anaerobic glycolysis.

I then attempted to isolate the agent by adsorption, the possibility of which had been suggested by my own experiments in the transmission of bacteria, by those of Pentimalli on the transmission of healthy embryonic cells, and by those of Carrell on normal macrophages. I therefore tried to isolate the ferment by Willstätter's well-known method, using variously charged adsorbents. In these experiments I was admirably assisted by Dr. Ernst Mislowitzer, of the Chemical Branch of the Pathological Institute, who placed his great experience in this field unreservedly at my disposal. Acting on his advice, we chose casein as the mildest of all the adsorbents. Adsorption was demonstrated by inoculation tests in six out of thirteen filtrates. On animal charcoal it occurred twice in five attempts, and on infusorial earth and kaolin three times out of five. Since the work was completed we have learnt that Lewis and Andervont[14] in America and Sebastiano[15] in Turin have also reported on adsorption experiments with organic and inorganic adsorbents. These authors attempt to explain their findings from the bacteriological aspect by drawing an analogy with the adsorption of various kinds of true filtrable virus. Believing, however, that the agent is like a ferment, we followed Willstätter's method and tried to isolate the blastogenic principle by washing it out of the adsorbent with phosphates on aluminium hydroxide, succeeding in six attempts out of ten.

It appeared to me that in order to form a correct opinion of the nature of the agent, it was necessary to estimate its size. The adsorption experiments had shown that a filtrate was often rendered ineffective by filtration through candles on account of adsorption; I therefore used gauged de Haen filters, membrane filters and "ultrafilters" (Bechhold's collodion filter). In these experiments the agent passed twice out of eight times through a medium membrane filter gauged to pass bacteria, and once out of seven times through a fine one. The inoculation test was positive, however, even after filtration, both through a rapid and a medium ultrafilter, the times being one to five and ten to fifty minutes respectively. The medium ultrafilter holds back benzopurpurin, but passes albumin; and the largest pores will let through particles of about 10 $\mu\mu$ diameter. Finer filters, such as the fine ultrafilter with a time of 100–500 minutes, and the finest ultrafilter have, however, not yet passed the blastogenic principle, so that its size must be about that of the albumin molecule. These filtration tests indicate that it is less likely to be a living virus than a chemical substance. Their results therefore confirm and amplify those of the adsorption and "elution" experiments.

Discussion.

There remains to be considered the application of these results to tumour research as a whole. The Rous fowl sarcoma is the only malignant tumour yet discovered that can be transmitted with certainty by means of cell-free filtrates. It is probable, however,

that a number of other mammalian tumours are capable of cell-free transmission. Blumenthal and his colleagues have succeeded in producing tumours in normal animals by injecting the spleen or blood of tumour-bearing rats and mice, and similar results have been achieved by Rhoda Erdmann with filtrates of Jensen's rat tumour. Kritchewski produced a tumour in a rat by injecting substance from a human melanotic sarcoma, and transmitted the tumour by means of sand filtrates and cystic fluid containing blood. None of these results, however, can yet be reproduced with anything like the same certainty and regularity as the cell-free transmission of Rous's fowl sarcoma, which is the only tumour of which the active principle can yet be separated with certainty from the cells. Most of the authorities who have worked with Rous's sarcoma have abandoned the view that the agent is a living virus. The belief in a virus which can lead of its own accord to the growth of a specific malignant tumour when introduced once into the body runs counter to the experience of all clinical and pathological research on tumours. On the contrary, clinical experience of tumours proves with certainty that they can be initiated in the human body by the following stimuli:—

1. Thermal—e.g., cancer of the abdominal skin caused by the "kangri."

2. Physical—e.g., cancer of the skin after X ray and radium applications.

3. Mechanical—e.g., traumatic sarcoma.

4. Chemical—e.g., aniline and paraffin cancer and the pulmonary lympho-sarcoma of the Schneeberg cobalt miners.

5. Parasitic—e.g., cancer of the bladder, due to bilharziasis; cancer of the tongue following syphilitic leucoplakia; and probably cancer of the gall-bladder and ducts in chronic streptococcal infection and cholelithiasis.

Experimental and animal pathology have also provided numerous examples of these various possible causes of malignant tumours. Briefly, a few of the best known are the spiropteric cancer of the stomach in rats, discovered by Fibiger; carcinoma following "kalkbein" of fowls; the production by Yamagiwa and his colleagues of carcinoma in mice by painting with tar over long periods, and the production of cancer in rats and in the ears of rabbits, and on fowls by Choldin; tumours produced with scarlet red by B. Fischer—and the results of inoculation or cell culture, combined with applications of tar and arsenious acid, reported by Carrell and Albert Fischer.

All these examples prove that malignant tumours can be evoked by the most varied causes. It is surely a mere complication to assume the existence of a second exogenous factor, such as a living virus, in addition to all this host of other causes. What we do not know, however, is the nature of the internal process which makes the malignant tumour grow in normal tissue or out of it. If we have succeeded in making it probable that the blastogenic principle isolated from the tumours of fowl sarcoma is not a living virus but a chemical agent or a ferment, it becomes possible to find a place for these tumours in the general theoretical fabric of neoplasmology. Up to the present, this is the only tumour in which the blastogenic principle has indubitably been isolated from the cells. Further research will doubtless be directed towards confirming these results and ascertaining whether they hold good for other malignant tumours. If, by the use of these or other methods, we can discover the nature of the chemicals or ferments which can be isolated from the growths and which stimulate the cells to tumour formation, we may find out that principle of the cause and development of tumours which underlies all the multifarious exciting factors.

Summary.

The tumour-producing agent ("blastogenic principle") of Rous fowl sarcoma filtrates can be separated from the tumour cells and isolated by the usual methods of ferment isolation.

A chemical or ferment theory of the "blastogenic principle" harmonises better with the facts of clinical and experimental investigation than does the hypothesis of a living virus.

References.

1. Fränkel, Ernst: Zeit. f. Krebsf., 1927, xxiv., 252; 1927, xxv., 407; 1928, xxvii., 152; 1928, xxvii., 467, 477.
2. Same author: Ibid., 1929, xxix., 491, 498, 501.
3. Same author: Centralb. f. Bact., 1929, xciii., 425; Berl. Micro-biol. Soc., February, 1929.
4. Rous, P.; Jour. Amer. Med. Assoc., 1911, lvi., 198; Jour. Exp. Med., 1911, xiii., 397.
5. Rous, P., and Murphy, G.: Jour. Amer. Med. Assoc., 1912, lviii., 1938; Berl. Klin. Woch, 1913, l., 637.
6. Rous and Tytler: Jour. Amer. Med. Assoc., 1912, lviii., 1793.
7. Gye and Barnard: THE LANCET, 1925, ii., 109.
8. Teutschländer: Zeit. f. Krebsf., 1923, xx., 43, 79.
9. Nakahara: Japan Jour. of Cancer Res., 1926.
10. Pentimalli, F.: Zeit. f. Krebsf., 1922, xv., 111, 115; 1924, xxii., 62, 74; Sperimentale, 1926, lxxx., 623.
11. Harde and Danysz: Comptes rend. Soc. de Biol., 1925, xciii., 1489; xciv., 1346; xciv., 251.
12. Sugiura, K., and Benedict, H.: Jour. Cancer Res., 1927, xi., 164.
13. Warburg, O.: Stoffwechsel der Tumoren, Berlin, 1926.
14. Lewis, M., and Andervont: Bull. Johns Hopkins Hosp., 1926, xl., 265.
15. Sebastiano: Arch. per le sci. med., 1928, lii., No. 7.
16. Blumenthal, Auler, Solecka: Zeit. f. Krebsf., 1927, xxv., 229.
17. Kritschewski, A., and Sinelnikow, S.: Ukraine Inst. path. in Charkow, 1926.
18. Choldin, S.: Zeit. f. Krebsf., 1922, xxv., 235.

DIAGNOSTIC VALUE OF THE ESTIMATION OF BLOOD CHOLESTEROL IN CHOLELITHIASIS.

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THIS investigation was undertaken to assess the diagnostic value of an estimation of the amount of cholesterol in the blood in cases of supposed cholelithiasis. Before investigating patients known to be suffering from this condition it is obviously essential to decide what can be considered as normal, and to define the limits of the normal, especially as there is considerable variation in the figures given by different authorities both for the mean value and the range of value.

In selecting a method for determining the amount of cholesterol one was chosen in which the quantity of blood withdrawn from the patient was large enough to ensure accuracy, but not so large that one or more withdrawals might impair the general condition, and was, comparatively speaking, easily and quickly carried out. The method was that advocated by Myers in his book,[1] and described originally in papers by Gorham and Myers,[2] and Myers and Wardell.[3] It had the disadvantage of being colorimetric and, therefore, open to an inevitable margin of error.

The estimation is carried out after obtaining the Liebermann-Burchard reaction for cholesterol in the fluid to be estimated. The only absolute method of estimating cholesterol is the gravimetric method of Windaus, after precipitation of the cholesterol in combination with digitonin. It is costly and tedious, and requires larger quantities of blood than are practicable in clinical work. Colorimetric estimation of cholesterol after obtaining the Salkowski reaction has no advantage over the other colorimetric method. For Myers' method 1 c.cm. of blood or serum is required, and a calculation is made to determine the number of grammes of cholesterol per 100 c.cm.

The figures for normal subjects given by various workers using different methods are as follows:—

Autenreith and Funk,[4] in a classical paper upon which much subsequent work has been based, give a normal range in whole blood of 0·140–0·160. They estimate against a

standard green colour in an Autenreith comparator after obtaining the Liebermann reaction in the unknown. They hint that, as the method is a colorimetric one, it can only be considered accurate to the second place of decimals. Henes,[5] using a very similar method, gives for serum a range of 0·110–0·182 with an average of 0·148. Grigaud,[6] estimating four normals, gives for whole blood 0·150–0·165 and for plasma 0·168–0·175, and Chauffard, Laroche, and Grigaud[7] for whole blood 0·150–0·180. Bacmeister and Havers[8] give for whole blood 0·110–0·180. Bloor,[9] using a special method of extraction, gives values for whole blood of 0·190–0·260, and for plasma of 0·170–0·240. Most other workers regard these figures as definitely too high. Gorham and Myers,[3] extracting dried blood, found a range of 0·130–0·190, with an average for 14 cases of 0·150. All these workers were using the Liebermann colour reaction. Weston and Kent,[10] using the Salkowski reaction, give a range of 0·117–0·297, with an average for 52 subjects of 0·182. Gardner,[11] using the digitonin method, gives for serum an average of 0·169 in 43 subjects.

TABLE I.

Age.	Sex.	Blood.					Plasma.					Remarks.
		Samples.	Highest.	Lowest.	Difference.	Mean value.	Samples.	Highest.	Lowest.	Difference.	Mean value.	
58	M.	4	0·120	0·116	0·004	0·119	—	—	—	—	—	Urethral stricture.
40	M.	2	0·178	0·174	0·004	0·176	—	—	—	—	—	Inguinal hernia.
25	M.	2	0·156	0·154	0·002	0·155	2	0·133	0·131	0·002	0·132	,, ,,
21	M.	2	0·102	0·098	0·004	0·100	2	0·092	0·090	0·002	0·091	Torn semilunar cartilage.
51	M.	2	0·169	0·163	0·006	0·166	2	0·146	0·138	0·008	0·142	Urethral stricture.
18	M.	2	0·206	0·200	0·006	0·203	2	0·184	0·179	0·005	0·182	Hydrocele.
32	M.	2	0·150	0·149	0·001	0·150	2	0·153	0·151	0·002	0·152	Torn semilunar cartilage.
56	F.	2	0·146	0·144	0·002	0·142	—	—	—	—	—	Carcinoma of liver.
50	M.	—	—	—	—	—	2	0·143	0·139	0·004	0·141	Inguinal hernia.
		Average				0·151	..	..	..	..	0·142	—

In determining the values for blood or plasma three or four estimations were carried out on each specimen, the cement used in the ordinary type of cup. For each estimation ten readings were taken.

In this manner an appreciable time was taken over one determination, and it was found that the intensity of the colour was increasing progressively. Investigation was made, therefore, on the rate of development of the intensity of colour in a standard solution of pure cholesterol after addition of acetic anhydride and pure sulphuric acid compared against a stable standard solution of naphthol green. It was found that it takes 45 minutes for the maximum intensity to develop.

This is a very important point, and one to which

TABLE II.

Age.	Sex.	Blood.					Plasma.				
		Samples.	Highest.	Lowest.	Difference.	Mean value.	Samples.	Highest.	Lowest.	Difference.	Mean value.
72	F.	—	—	—	—	—	2	0·285	0·275	0·01	0·280
56	F.	—	—	—	—	—	2	0·216	0·210	0·006	0·213
43	F.	—	—	—	—	—	2	0·306	0·305	0·001	0·306
45	F.	—	—	—	—	—	2	0·145	0·144	0·001	0·145
50	M.	—	—	—	—	—	2	0·210	0·205	0·005	0·207
45	F.	3	0·143	0·139	0·004	0·141	2	0·152	0·143	0·009	0·148
50	F.	2	0·216	0·210	0·006	0·214	2	0·225	0·217	0·008	0·221
42	F.	2	0·107	0·106	0·001	0·106	2	0·130	0·126	0·004	0·128
49	F.	2	0·213	0·205	0·008	0·210	2	0·200	0·191	0·009	0·194
53	F.	4	0·129	0·126	0·003	0·128	—	—	—	—	—
48	M.	2	0·215	0·205	0·01	0·210	—	—	—	—	—
50	M.	2	0·283	0·273	0·01	0·278	—	—	—	—	—
44	F.	2	0·162	0·156	0·006	0·159	—	—	—	—	—
57	F.	2	0·168	0·165	0·003	0·166	—	—	—	—	—
		Average ..		..	..	0·179	..	..	..	..	0·204

necessitating the withdrawal of from 3 to 6 c.cm of blood. Considerable discrepancies were found, and certain modifications were introduced into the method. Similar unsatisfactory results obtained by Myers's method have been recorded by Ling.[12] The stages of the method were investigated and the following conclusions reached. It appeared to be immaterial whether the mixing of the blood or serum with plaster-of-Paris was carried out roughly with a glass rod or intimately in a pestle and mortar. After extraction for half an hour, it was still possible in many cases by further extraction to find remaining cholesterol capable of estimation, and it was found necessary to extract for one and a half hours.

The amounts of reacting substances were doubled, but the proportions kept unchanged. As there was insufficient attention has been directed. Myers advises reading after ten minutes, but it is of interest to note that Grigaud[13] states that half an hour is the ideal time, while Autenreith and Funk advise 20 minutes.[4] The rate of development shows no variation within the ordinary range of room temperature, and this accords with the findings of the rate of development of the Salkowski reaction as recorded by Weston and Kent.[10] Bright sunlight should be avoided, but it is unnecessary to keep the reagents in the dark.

In subsequent work a standard solution of cholesterol was always used, as solutions of naphthol green have a yellow-green tinge, as opposed to the blue-green of the Liebermann reaction, and make matching of the colour very difficult. The reaction given by pure

cholesterol is always bluer than that given by specimens of blood or plasma, indicating that the two substances are not identical. This has been noted by other workers, Bloor[9] and Autenreith and Funk[4] supposing it to be due to overheating during extraction. Mueller[14] has shown that the colorimetric methods always yield higher figures than the gravimetric, indicating that they estimate derivatives of cholesterol as well as pure cholesterol and its esters. Strictly comparable readings were obtained both by daylight and by artificial illumination, but daylight was preferable as less fatiguing.

The Technique.

The method which was used therefore was as follows:—

One c.cm. of whole blood or plasma was measured from a pipette on to about 5 g. of plaster-of-Paris contained in a small evaporating basin, mixed by stirring and pounding with a glass rod, and dried in a hot-air oven for an hour. The dried mixture was then transferred to an extraction thimble about 5 cm. long, contained in a perforated glass tube fixed in the upper part of a 150 c.cm. flask containing about 20 c.cm. of chloroform at the bottom, and glass beads to prevent bumping. Extraction was then carried out under a double-surface reflux condenser on an electric sand-bath at constant temperature for one and a half hours. At the end of this time the extract was made up to 15 c.cm. at 15°. Ten c.cm. of this were taken, and 4 c.cm. of acetic anhydride and 2 c.cm. of pure sulphuric acid added. The mixture was stirred with a glass rod and inverted several times, the tube being closed by a rubber stopper and allowed to stand on the bench out of direct sunlight. Comparisons were made with 10 c.cm. of a standard solution of pure cholesterol similarly treated after standing for 45 minutes. Readings were then taken.

In all cases, two or even four estimations were carried out simultaneously on any given sample of blood or plasma. These can be carried out quite easily by using a battery of four double-surface condensers over an electric sand-bath. By this method the error should not exceed 2·5 per cent. As the method is a colorimetric one, some error is inevitable, and caution is therefore necessary before attaching importance to small variations in the estimated cholesterol value. Further, it is desirable for accurate work to estimate more than one specimen from any given case. The majority of estimations were made on whole blood, to correlate them with results obtained in experimental animals, in which it is impracticable to work with plasma owing to the small volume of the total blood in the animal. This is open to criticism in that it is well established that the cholesterol of the corpuscles is mostly free, while in the plasma more esters are present. Henes,[5] however, has pointed out that relative changes in the whole blood or plasma appear strictly comparable.

The method of estimation described gives the value for free cholesterol plus cholesterol esters. In Table I. figures obtained from blood or plasma in nine normal individuals are recorded, with the amount of variation in and the number of estimations of identical specimens. The average value was 0·151 for whole blood and 0·142 for plasma. This agrees with figures given by other workers, but the range 0·100–0·203 is considerably greater than that given by most, though Weston and Kent,[10] in their series of 52 normals, record a range of 0·117–0·297.

Variations with Diet.

The next point was to determine whether for any given individual the cholesterol value was comparatively stable on an ordinary mixed diet. Specimens were obtained from two normal individuals at various times in the day without any reference to the time after the last meal, and showed remarkable constancy. In the first case, a man aged 31, estimations on the first day gave a value of 0·150 for whole blood. Estimations were again carried out on the nineteenth and two following days, and on each occasion the value was 0·150. The second individual, a man of 68, gave values in whole blood on three successive days of 0·119, 0·118, and 0·122. This demonstrates a remarkable constancy for any given individual. Rothschild[15] and Luden[16] have obtained similar results in experimental animals, and I have found it true in the cat.

The figures obtained from individuals suffering from cholelithiasis uncomplicated by jaundice often show low values, although the average is higher, and therefore the diagnostic assistance of the estimation is negligible. It is but fair to point out that some workers explain these low values as due to coexistent sepsis, but on comparing the chemical and clinical findings there appeared no close relationship between the two. The figures obtained are shown in Table II. It is of interest to note that there appears some indication of a reversal of the relationship between the whole blood and the plasma cholesterol.

TABLE III.

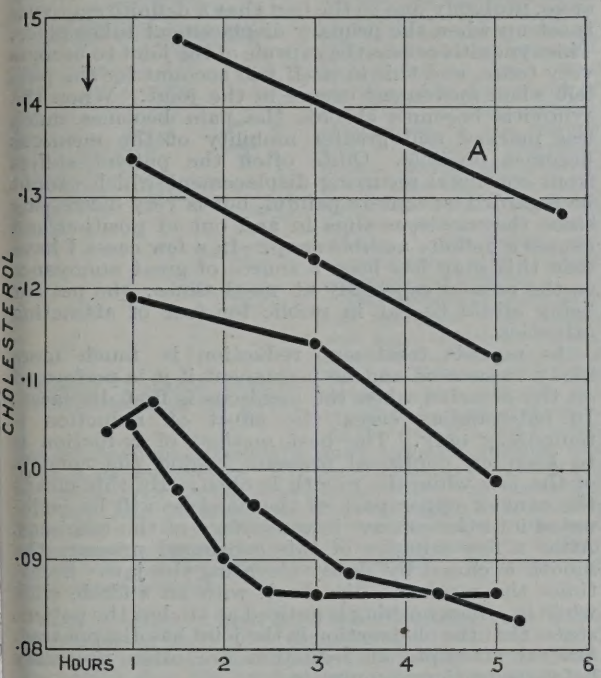
Age.	Sex.	Blood.					Plasma.					—	Duration.	Blood.	Plasma.
		Samples.	Highest.	Lowest.	Difference.	Mean value.	Samples.	Highest.	Lowest.	Difference.	Mean value.				
25	M.	2	0·156	0·154	0·002	0·155	2	0·133	0·131	0·002	0·132	Inguinal hernia.	45°	—0·045	—0·038
		2	0·111	0·109	0·002	0·110	2	0·095	0·093	0·002	0·094				
18	M.	2	0·206	0·200	0·006	0·204	2	0·184	0·179	0·005	0·182	Hydrocele.	45°	—0·031	—0·052
		2	0·174	0·171	0·003	0·173	2	0·132	0·128	0·004	0·130				
21	M.	2	0·102	0·098	0·004	0·100	2	0·092	0·090	0·002	0·091	Semilunar cartilage.	45°	+0·017	+0·005
		2	0·121	0·115	0·006	0·117	2	0·097	0·096	0·001	0·096				
45	F.	3	0·143	0·139	0·004	0·141	2	0·152	0·143	0·009	0·148	Gall-stones.	120°	+0·001	—0·008
		2	0·146	0·136	0·010	0·142	2	0·142	0·137	0·005	0·140				
50	F.	2	0·216	0·210	0·006	0·214	2	0·215	0·210	0·005	0·213	Gall-stones.	80°	—0·073	—0·116
		2	0·141	0·140	0·001	0·141	2	0·098	0·096	0·002	0·097				
47	F.	2	0·213	0·205	0·008	0·210	2	0·200	0·191	0·009	0·195	Gall-stones.	75°	—0·025	—0·001
		2	0·186	0·184	0·002	0·185	2	0·197	0·191	0·006	0·194				

One estimation either of the whole blood or plasma cholesterol is of no assistance in diagnosis. Gorham and Myers[2] found the values quite inconstant, but Henes[17] claims to be able to base a diagnosis on this information. High values could only be obtained with certainty in cases of severe obstructive jaundice; the milder types of catarrhal jaundice gave normal figures. Thus in three cases of carcinoma of the pancreas with severe jaundice the values in whole blood were 0·375, 0·334, and 0·225, while in three cases of catarrhal jaundice the figures were 0·187, 0·155, and 0·143. This agrees with the findings of Rothschild and Rosenthal,[18] who found in 37 cases of cholelithiasis values of 0·132–0·425, the high values being found in cases complicated by jaundice, and of Rothschild and Felsen,[19] who describe the height as roughly proportional to the jaundice. It is interesting to note that these high values drop rapidly after relief of the jaundice by drainage. Thus the case giving a value of 0·375 before drainage fell to 0·237 in ten days, and one giving 0·334 before operation to 0·160 in 15 days. Rothschild and Rosenthal[18] have obtained similar results, and Campbell[23] corroborates them.

The Effect of Anæsthetics.

As it appeared that the fall might be due to or influenced by the anæsthetic used at the operation, the effects of general anæsthesia on the blood cholesterol were investigated. There is little in the literature on this. Rothschild and Wilensky[20] assume that a

fall occurs, whilst Mahler,[19] using Leiboff's[22] modification of Myers' method, found that there was a constant rise with ether anæsthesia of an hour's duration. It must be pointed out, however, that this method consists of one estimation on 0·25 c.cm. of blood, and the increases recorded are small. In Table III. are shown figures for whole blood and plasma in cases subjected to ether anæsthesia for periods varying from 45 to 120 minutes. The changes



Blood cholesterol in cats under ether anæsthesia. Anæsthetic started at point indicated by arrow.

appear to be definitely in the direction of a fall, in one case well marked.

This point was further investigated in cats over long periods of ether anæsthesia. The blood cholesterol value in the cat is 0·100–0·150, and appears, in contrast to the human subject, to vary with the size of the animal. The specimens of blood were obtained from the femoral vein. The results are shown in the Figure. Part of this fall in the cat might be explained by dilution of the blood with cholesterol-poor fluid to maintain the blood volume against the repeated withdrawal of relatively large quantities (3–6 c.cm.) of blood, the total blood volume of the cat being about 140 c.cm. That it is not entirely due to this is shown by the experiment marked A, made on two estimations only, one taken one hour, and the second five and a half hours after the commencement of anæsthesia. In no case was a fall produced by anæsthesia sufficient to explain that found after the relief and drainage of a case of obstructive jaundice.

Summary.

1. A modification in the technique for estimating the amount of cholesterol in the blood is described. 2. The normal range of value is shown to be greater than is usually realised. 3. Although the average value is raised in subjects suffering from cholelithiasis, estimation on an individual case is useless as a means of diagnosis. 4. The whole blood cholesterol is very markedly raised in the severer degrees of obstructive jaundice, the rise disappearing when the jaundice is relieved by biliary drainage. 5. Ether anæsthesia tends to produce a fall in the blood cholesterol, but this can be responsible for only a small part of the fall after biliary drainage. 6. The blood cholesterol tends to maintain a constant level in any normal human subject.

This work was carried out during my tenure of a research scholarship at St. Thomas's Medical School, and I am indebted to my colleagues for access to cases under their charge.

References.

1. Myers, V. C.: Practical Chemical Analysis of Blood, London, 1924.
2. Gorham, F. D., and Myers: Arch. Int. Med., 1917, xx., 599.
3. Myers and Wardell, E. L.: Jour. Biol. Chem., 1915, xxxvi., 147.
4. Autenreith, W., and Funk, A.: Münch. Med. Woch., 1913, lx., 1243.
5. Henes, J. E.: Deut. Arch. für Klin. Med., 1913, iii., 122.
6. Grigaud, A.: Biol. Méd., 1913, xi., 89.
7. Chauffard, Laroche, and Grigaud: Compt. rend. Soc. de Biol., 1911, lxx., 336.
8. Bacmeister and Havers, C. M.: Deut. Med. Woch., 1914, 385.
9. Bloor, W. R.: Jour. Biol. Chem., 1916, xxv., 577; also 1916, xxiv., 227, and 1916, xxvii., 107.
10. Weston, P. G., and Kent, G. H.: Jour. Med. Res., 1912, xxvi., 47 and 531.
11. Gardner, J. A.: Biochem. Jour., 1927, xxi., 141.
12. Ling, S. M.: Jour. Biol. Chem., 1928, lxxvi., 361.
13. Grigaud, A.: Compt. rend. Soc. de Biol., 1911, lxxi., 513.
14. Mueller, J. H.: Jour. Biol. Chem., 1916, xxv., 547.
15. Rothschild, M. A.: Beitr. z. Path. Anat. u.z. allg. Path., 1915, lx., 39.
16. Luden, G.: Jour. Biol. Chem., 1916, xxvii., 273.
17. Henes, E.: Surg., Gyn., and Obst., 1916, xxiii., 91.
18. Rothschild, M., and Rosenthal, N.: Amer. Jour. Med. Sci., 1916, clii., 394.
19. Rothschild and Felsen, J.: Arch. Int. Med., 1919, xxiv., 520.
20. Rothschild and Wilensky, A. O.: Amer. Jour. Med. Sci., 1918, clvi., 239, 404, 564.
21. Mahler, A.: Jour. Biol. Chem., 1926, lxix., 653.
22. Leiboff, S. L.: Ibid., 1924, lxi., 177.
23. Campbell, J. M. H.: Quart. Jour. Med., 1924, lxix., 123.

THE CAUSATION AND TREATMENT OF DISPLACED MANDIBULAR CARTILAGE.

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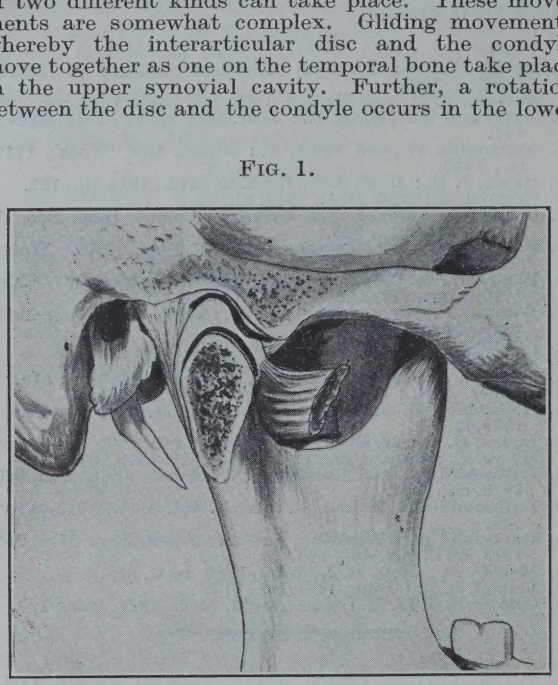
The temporo-mandibular joint, although a somewhat complex structure, is nevertheless very stable and dislocation of the joint itself or of its meniscus or fibrocartilage is uncommon.

Displacement of the mandibular cartilage is a rare accident and this is probably due mainly to the shape and attachments of this meniscus. The fibrocartilage is a dome-like structure very closely applied to the convexity of the mandibular condyle. As far as thickness is concerned it is irregular, being very much thicker in its centre and anteriorly (see Fig. 1); between these two thickenings there is a distinct depression. The posterior part of the cartilage is very thin and passes well down over the posterior surface of the condyle and fuses behind with the capsule. I have examined over 50 specimens of the mandibular fibrocartilage in the anatomical department at King's College and in the post-mortem department at King's College Hospital and all conform to the description I have given. This description is, however, at variance with the descriptions given in the current standard text-books of anatomy, the most common description being that the interarticular fibrocartilage is an oval plate thinnest at the centre, where it is occasionally perforated, and thickest posteriorly. I have never seen a perforated interarticular fibrocartilage in this joint in either young or old subjects. The anatomical description to which most of the text-books conform must have been handed down for generations and nobody has troubled to investigate the matter and verify the commonly accepted description. Most text-books of anatomy contain quite good sectional diagrams of this joint which, to the most casual reader, are obviously at variance with the text description.

The temporo-mandibular joint is divided by the fibrocartilaginous disc into two cavities, each provided

with a distinct synovial membrane. The circumference of the disc is adherent to the capsular ligament and anteriorly affords partial insertion to the external pterygoid muscle. It is owing to the fact that there are two definite cavities in this joint that movements of two different kinds can take place. These movements are somewhat complex. Gliding movements whereby the interarticular disc and the condyle move together as one on the temporal bone take place in the upper synovial cavity. Further, a rotation between the disc and the condyle occurs in the lower

FIG. 1.



Section of right temporo-mandibular joint showing shape and relations of the meniscus.

synovial cavity. Probably these two movements rarely occur independently of one another.

The somewhat frequent displacement of the medial meniscus of the knee-joint is due to the fact that the cartilage is placed at the periphery of a very shallow concavity, and also to the fact that the internal lateral ligament of the knee-joint is adherent to it. The latter fact is important, since whenever this ligament is put on the stretch it tends to pull the meniscus beyond the limits of the joint. Displacement of the internal meniscus of the knee-joint is the result of some sudden movement of the joint; similarly, displacement of the mandibular meniscus is due to some sudden or irregular contraction of the external pterygoid muscle. Unlike the medial meniscus of the knee-joint, which may be torn or ruptured, the mandibular cartilage always remains intact. Displacement of the cartilage may be caused by a violent cough, sneeze, or yawn, the external pterygoid muscle contracting during the rapid closing of the mouth and drawing the cartilaginous disc obliquely forwards and inwards. Occasionally displacement may result from a blow on the jaw when the mouth is open, the trauma not being of sufficient force as to cause dislocation of the condyle over the eminentia articularis of the temporal bone. Again, displacement occurred in one of my patients as the result of extraction of one of the lower molar teeth.

The posterior thinned-out part of the meniscus becomes detached from the capsule and this permits it to be drawn forwards and inwards by the external pterygoid muscle, and as the mouth closes by elevation of the jaw the disc of cartilage becomes severely crushed between the condyle and the temporal bone.

The symptoms caused by such a displacement are very characteristic. The patient experiences sudden acute pain in the joint which may be referred to the pinna or the skin above the pinna. This referred pain is due to the fact that the auriculo-temporal nerve not only supplies the joint but also gives off sensory branches which supply the upper part of the pinna and the skin above it. All attempts to close the mouth are painful and the patient will sometimes volunteer the remark "there is something sticking in front of my jaw which prevents my shutting my mouth." Excessive salivation is often a marked feature, but in old-standing cases or in those in which the meniscus is very mobile owing to repeated displacement it is often so slight as not to cause the patient any annoyance. Mastication is attended with considerable difficulty, as slight chewing causes acute pain. This, however, becomes less marked in a day or so, probably due to the fact that a definite synovitis is set up when the primary displacement takes place. This synovitis causes the capsule of the joint to become very tense, and this in itself will account for the pain felt when movement occurs in the joint. When the synovitis becomes chronic the pain becomes much less marked and greater mobility of the meniscus becomes possible. Quite often the patient suffers from continual recurring displacement which cannot be regarded as acutely painful, but is very distressing since the meniscus slips in and out of position and causes a definite audible snap. In a few cases I have seen this snap has been a source of great annoyance to the patient especially at meal times, the patient being afraid to eat in public for fear of attracting attention.

As regards treatment reduction is much more likely to succeed and be permanent if it is performed on the occasion when the meniscus is first displaced. In old-standing cases the effect of reduction is temporary only. The best method of reduction is to keep up continual pressure behind the condyle of the jaw while the mouth is open. By this means the convex upper part of the condyle will be insinuated into the concave lower surface of the meniscus. After a few minutes of this continued pressure the mouth is closed by slowly elevating the jaw. Sometimes the meniscus slips back with an audible click while in others nothing is noticed at all, but the patient states that the obstruction in the joint has disappeared. Several attempts at reduction are often necessary before reduction is complete.

In cases where displacement is more or less continuous the same changes take place in this joint as occur in the larger joints—e.g., the knee when recurrent displacement of the medial meniscus takes place. The periarticular tissues, capsule, ligaments, and muscles become repeatedly stretched and eventually become relaxed; this allows the meniscus to be displaced whenever the mouth is widely opened. In these chronic cases no treatment with the exception of excision is of any avail. Fortunately, most of these patients are quite content to put up with the slight pain and the inconvenience caused by the repeated "snapping" of the meniscus. Occasionally, however, one meets with a patient who implores the surgeon to give relief from the chronic pain and the continual "snapping" which is described as unbearable. One of my patients was actually contemplating suicide unless relief from the noise could be obtained. She explained that she was forced to take her meals by herself as her husband objected to "the noise she made when she was eating."

Illustrative Cases.

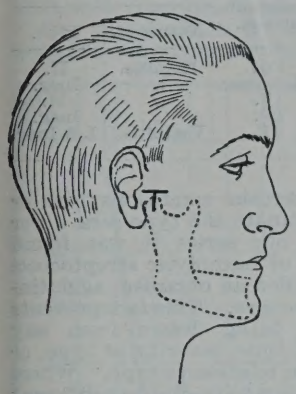
Out of eight patients who have come to me for treatment with recurrent displacement of the mandibular meniscus operation was considered necessary in two only. The reports of the cases are as follows:—

CASE 1.—Mrs. A., aged 31, came under observation in 1922 complaining of pain and a loud clicking noise in the right temporo-mandibular joint. The pain was first noticed two years previously; it came on suddenly after a violent fit of coughing, and for a week at least the patient was unable to close her mouth properly. As the pain became less marked she felt as if some foreign body was in the joint, and whever she opened her mouth at all widely she heard a definite click. The click was then noticed at meal times and became more audible not only to the patient but also to her husband. When she came up to hospital she was in a very depressed condition, had lost two stone in weight

during the previous year, and implored for relief from the constant clicking noise which she said was driving her mad. Local treatment in the shape of diathermy to the side of the face over the joint was given for ten days, but without relief.

Operation was performed in June, 1922, and the joint was explored through a T-shaped incision (Fig. 2). The capsule was opened and the cartilage was found to be extremely loose and attached in front only, having no connexion whatever behind. The cartilage could be moved in any direction even when the jaw was depressed as far as possible. Notwithstanding the two years' history, there was no sign of osteo-arthritis in the joint. The cartilage was drawn out of the joint, and its anterior attachment to the capsule and external pterygoid muscle having been severed, it was removed. The opening in the capsule was closed by three interrupted catgut sutures. The skin was approximated by three silkworm gut sutures.

FIG. 2.



Showing T-shaped incision used in exposing the joint.

For the first 12 hours after the operation the mouth was kept closed by means of a four-tail bandage. After this an elastic strap was applied which allowed the mouth to be opened slightly. At the end of a week when the stitches were removed a small collodion dressing was applied and no bandage. The patient had no pain after the operation, even during mastication. She was discharged nine days after the operation. When seen again three months later she was very pleased with her condition. She had experienced no pain whatever. The scar was very slightly visible and was easily covered by her hair. Movements of the jaw were normal.

CASE 2.—Miss E., aged 25, a school-mistress, came under observation in May, 1926, complaining of pain and a loud crackling noise in her right temporo-mandibular joint. She stated that the trouble commenced three years ago and was caused by the extraction of her lower wisdom tooth. The tooth, which probably was erupting abnormally, was extracted under general anæsthesia. Her face became very swollen the day after the extraction and she could not close her mouth. Three weeks at least elapsed before the swelling completely disappeared and then the patient noticed that she could not bite her food with her front teeth without suffering pain. The pain, however, gradually disappeared but she became conscious of something inside the joint of her jaw. Soon after this the patient noticed a definite clicking sound whenever she opened her mouth, and especially on mastication. The click became more marked and was audible not only to the patient but also to her friends. She sought advice at hospitals and even went to a bone setter who gave her three treatments without avail. The treatment she received from the bone-setter seemed to consist of repeated sharp blows with a sandbag to the nape of the neck, but even this treatment did not prevent the constant clicking sound whenever she ate or opened her mouth at all widely.

In view of the long history in this case, operation was advised. The joint was explored through a T-shaped incision and a very mobile meniscus, which was simply anchored anteriorly, was easily removed. Recovery was uneventful and when seen last in December, 1928, some two and a half years after her operation, she was perfectly happy. There was no pain on mastication or on forcible movements of the jaw, and the audible click had disappeared.

THE QUEEN'S HOSPITAL, SIDCUP.—This great hospital is to be closed next month, the 80 remaining patients being removed either to the Roehampton Hospital or the Highbury Hospital, Birmingham. The institution, which has more than 500 beds, was opened in August, 1917, and nearly 19,000 patients have passed through it. Although not actually owned by the Ministry of Pensions, it is staffed and generally financed by that department. The buildings are wooden hutments on brick foundations, and are surrounded by nearly 100 acres of grounds.

SCARLET FEVER.

SOME ASPECTS OF BACTERIOLOGY AND SERUM TREATMENT.

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THE investigations of the Dicks[1] since 1923 into the ætiology and treatment of scarlet fever, and the confirmation of their work by others, have resulted in a great advance in our knowledge not only of scarlet fever but also of all infections due to hæmolytic streptococci. It is known that the hæmolytic streptococcus produces a different disease according to the virulence of the organism, the susceptibility of those attacked and the kind of tissue invaded. At the present time there is a weight of evidence in favour of the conception that scarlet fever, puerperal fever, erysipelas, streptococcal tonsillitis, and septicæmia can be caused by similar strains of hæmolytic streptococci.

The results of certain investigations into cases of scarlet fever admitted to the Ilford Isolation Hospital during a period of two and a half years are interesting as regards (1) the bacteriological examination of 265 consecutive cases, January to October, 1928, with the addition of four cases complicated by mastoiditis which were admitted in 1929; and (2) the complications of a series of 670 consecutive serum-treated cases from April, 1926, to October, 1928.

Bacteriology.

Smith,[2] Griffith,[3] and James[4] originally described three distinct serological types of *Streptococcus scarlatinæ*, and to these a fourth type has been added by Griffith.[3] This leaves a large group of hæmolytic streptococci which are inagglutinable with the four type sera. As a result of an investigation into the serological differences of 101 scarlatinal strains of hæmolytic streptococci and 30 non-scarlatinal strains, McLachlan and Mackie[5] state that although certain serological groups among scarlatinal streptococci may be recognised as corresponding generally to types described by Smith and Griffith, there is such considerable antigenic overlapping among the different groups that the differentiation and relationship of strains cannot be expressed satisfactorily by formulating definite serological types. Gunn[6] attempted to correlate the relationship between the various types of hæmolytic streptococci described by Griffith with clinical types of scarlet fever, and stated that his results indicated that type 2 produces the most severe form of scarlet fever, type 3 is intermediate in severity, type 1 is as severe as type 3, and type 4 is the mildest type, while the inagglutinable strains vary in virulence.

TABLE I.—*Incidence of Types of Hæmolytic Streptococci in Cases of Scarlet Fever.*

—	Ilford Isol. Hosp.	Gunn. 1926.	Gunn and Griffith. 1927.	Smith, J.	Mackie and McLachlan.
	Per cent.				
Type I. ..	11	2	8·8	57	31
,, II. ..	18	36	15	27	22
,, III. ..	8·8	18	28	—	—
,, IV. ..	8·2	24	13	—	—
Inagglutinable.	53·9	18	34	—	—

The serological typing of the strains from our cases was performed by Dr. A. B. Rosher, of the Charing Cross Institute of Pathology. Swabs were taken from the throats of 265 cases on admission, and 191 gave positive results. Six showed mixed serological types. The distribution in the other cases is compared in Table I. with the results of other workers.

An attempt has been made in Tables II. and III. to investigate any relationship which may exist between various types of hæmolytic streptococci and the clinical aspects of the disease in the Ilford series of cases.

TABLE II.—*Incidence of Early Severity of Disease According to Type of Hæmolytic Streptococcus.*

Type ..	I.	II.	III.	IV.	Inagg. hæm. strep.
Pyrexia duration in hours*	41·1	41·5	38·8	29·9	35·2
No. of cases vomiting ..	12 (60%)	18 (56%)	8 (53%)	5 (35%)	44 (46%)
Early adenitis	5 (20%)	5 (15%)	3 (20%)	2 (13%)	21 (22%)

* Average (from time of administration of serum).

TABLE III.—*Type of Hæmolytic Streptococcus in 182 Cases of Scarlet Fever with Complications.*

Type.. ..	I.	II.	III.	IV.	Inagg. hæm. strep.
Complicated cases ..	6	10	6	4	32
Rhinitis	2	2	3	1	9
Adenitis	2	8	3	1	18
Otitis	1	2	1	—	11
Tonsillitis	—	1	1	—	3
Suppurative adenitis	—	1	—	—	—
Relapse	1	—	—	—	1
Mastoiditis	—	—	—	—	—
Nephritis	—	1	1	—	1
Abscess	1	—	—	—	—
Vaginitis	—	—	—	1	—
Rheumatism ..	—	—	—	1	2
Albuminuria ..	—	—	—	—	1

This table is exclusive of complications found to be due to a different type of hæmolytic streptococcus to that found in the primary infection.

Tables II. and III. indicate that types 1, 2, and 3 resemble each other in producing the most severe initial symptoms of scarlet fever, type 4 the mildest, while the inagglutinable group occupies an intermediate position. Type 2 appears to be the most likely to produce complications, type 4 the least, type 3 more than type 1. The inagglutinable group varies from frequent to low incidence of complications. These results confirm those of Gunn. When, however, it is remembered that 53·9 per cent. of the hæmolytic streptococci in our series, and 34 per cent. in Gunn's series were not typeable, it is obvious that it is unsound to base any final conclusion on these figures. In addition, it should be noted (1) that the numbers dealt with are small, and (2) that more complications would be present if those due to a different type of organism to that in the primary infection were included. In 24 cases where hæmolytic streptococci were found in the throat on admission, they were found also in the complication. The hæmolytic streptococcus in the primary infection and in the complication were apparently the same in 14 complicated cases, although in six of the cases the streptococcus, either from the fauces on admission or from the complication, was not typeable. The complications which occurred in the 14 cases were: relapse (1); rhinitis (3); abscesses (3); puerperal fever (1); otitis (6); mastoiditis (7). The streptococcus in the primary infection and in the complication was apparently different in ten complicated cases, although it will be noted that in a number of cases the streptococcus in the complication was not typeable.

The results given in Table IV. appear to show that some complications in scarlet fever are due to reinfection with a different type of hæmolytic streptococcus to that in the primary infection. Although cross-infection with septic complications has been known for many years as an administrative problem in isolation hospitals, it is not clear that either our results or those of Gunn definitely demonstrate that such infection is always due to a streptococcus of a different type from that in the primary infection.

The inagglutinable group of hæmolytic streptococci appears to be made up of: (1) strains of hæmolytic streptococci which do not agglutinate with the type sera under any conditions, and (2) hæmolytic

TABLE IV.

Type at onset of attack.	Complication.		Type at onset of attack.	Complication.	
	Nature of.	Type.		Nature of.	Type.
I.	Tonsillitis.	Inag.	III.	Rhinitis.	II.
II.	,,	IV.	III. & Inag.	,,	Inag.
III.	,,	Inag.	IV.	,,	II.
I.	Rhinitis	,,	IV.	,,	Inag.
II.	,,	,,	II.	Vaginitis.	I. & Inag.

streptococci which under certain conditions lose or acquire the power to agglutinate the type sera. For instance, in ten cases in our series it was found that inagglutinable strains of hæmolytic streptococci on repeated subculture yielded an organism agglutinable with one of the four type sera. This fact prevents any dogmatic deductions being drawn from any statistics as to incidence of type, severity of type, or incidence of complications in relation to type. Where complications have been shown to be due to a different type of hæmolytic streptococcus, one must omit all cases belonging to the inagglutinable group, for the strain may have changed in the same patient from a typeable to a non-typeable strain, or vice versa. Although four distinct types can be differentiated by serological means, before these types are accepted as being of clinical value, further investigation is required as to (1) antigenic overlapping, and (2) interconvertability of the four types.

In considering the question of complications being produced by reinfection with a different type of hæmolytic streptococcus, one has to consider also the possibility of the original infection being caused by more than one type of hæmolytic streptococcus, although only one type has been found by the methods used. The same problem exists as in the investigation of the virulence of diphtheria bacilli, where non-virulent and virulent colonies may be present. If the investigator happens only to subculture the one type of colony, an erroneous result is obtained.

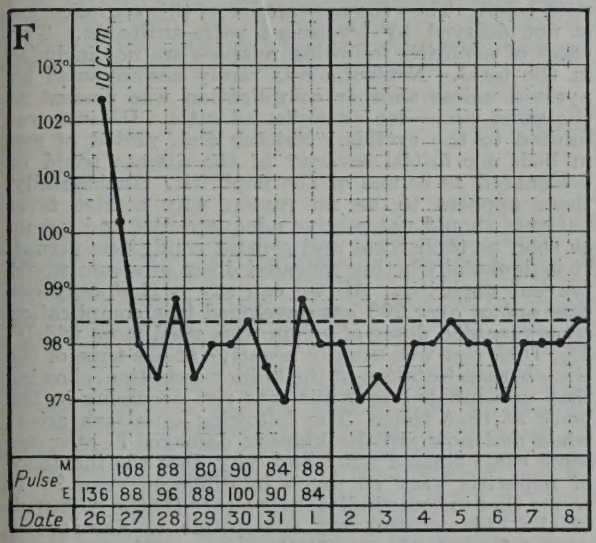
Gunn[6] has stated that in a series of non-serum treated cases, failure to acquire complete immunity was never found in patients infected by hæmolytic streptococci of the types 1, 2, and 3. We found that, including all sizes of reaction, cases which were infected with types 1, 2, or 3 gave the least number of positive Dick results during convalescence, and those with type 4 the greatest number. We analysed the results of the bacteriological examination of 29 cases admitted from 14 families. These showed type 2 in three families, type 4 in one family and inagglutinable streptococci in four families, while in six families, one or more members showed one of the four types, while the other member had an inagglutinable strain.

Gunn and Griffith[7] have stated that, although 55 patients in their series were discharged from hospital "carrying" hæmolytic streptococci, as far as could be ascertained none of these gave rise to any return cases. In the Ilford cases, however, hæmolytic streptococci were found in five patients, examined at various periods from 11 to 21 days after their discharge from hospital, who had given rise to eight return cases in their own families. Of these five patients, three showed inagglutinable streptococci, one showed type 2, and one type 3, while the fifth showed a mixture of inagglutinable streptococci with type 4. We were only able to obtain positive results in three of the return cases. (In one of these, the infecting case had inagglutinable streptococci, while the two return cases both had inagglutinable streptococci. In the other case, while the infecting case had inagglutinable streptococci, the return case showed type 2 hæmolytic streptococci.)

Effects of Serum Treatment.

Since April, 1926, all cases of scarlet fever admitted to the Ilford Isolation Hospital have been treated with scarlatinal antitoxic serum. Every case was given antitoxin as a routine measure because: (1) as scarlet fever antitoxin is a specific remedy it should be of value in every case of disease due to the specific organism, and (2) mild cases of scarlet fever may yet develop severe complications, and it is only by administering the serum to all cases that such complications may be avoided.

The series which we describe comprises 670 consecutive admissions. Only concentrated serum was



Temperature chart of a female patient aged 27, admitted to hospital with scarlet fever on first day of rash, showing critical fall of temperature after injection of 10·0 c.cm. of antiscarlatinal serum. In this case the infecting organism was a streptococcus of type 2.

used, and the routine dose was 10 c.cm., injected intramuscularly. Repeated doses were given in 7 per cent. of cases. Intravenous administration was not used as a routine measure because it was considered unjustifiable to expose young children to a possible fatal therapeutic risk in a disease which at the present time is usually non-fatal. Our policy in this respect is confirmed by Toomey and Dolch,[8] who had three deaths with anaphylactic symptoms out of 40 patients injected intravenously, and also by the series of 404 cases treated intravenously by Banks and Mackenzie,[9] where one death with anaphylactic symptoms resulted. We are of the opinion that intravenous therapy should be reserved for toxic cases. In our cases the intramuscular administration of serum was attended by no ill-effects.

A serum rash occurred in 24·5 per cent. of the cases. It caused very little inconvenience, and was usually accompanied by no rise in temperature. No other symptoms of serum sickness were observed. Of 27 cases desensitised owing to a previous history of administration of serum, 14 developed a serum rash with no other symptoms. In all our cases we administered calcium salts, as suggested by Rolleston,[10] and although it is impossible to give any statistical evidence, our opinion is that they reduced the incidence of severe serum sickness. (We observed, for instance, in the diphtheria ward that when the administration of calcium salts was discontinued for a time, serum rashes were much more severe and accompanied by more constitutional disturbance.) The effect on the patient of the administration of the serum was in all cases very marked. The temperature fell to normal by crisis in over 60 per cent.; in some cases it tended to be unsettled after the fall. There was a rapid improvement in the subjective condition and relief of the faucial congestion. There appeared to be no relationship between the day of the disease on which the serum was given and the effect on the pyrexia. Toxæmia is combated by antitoxin whether the serum is given on the first or the fifth day of the disease, but antitoxin will not repair the damage done to the tissues before administration.

It is extremely difficult to produce any satisfactory evidence of the value of scarlatinal antitoxic serum as a routine measure in all cases, as at the present time this disease is so mild. Other writers have attempted to assess it by stating (1) that the length of stay in the hospital can be shortened, (2) that the incidence of complications can be considerably reduced, and (3) that septic complications can be avoided. As the temperature becomes normal 24 to 36 hours after administration of the serum, a large proportion of the cases could be discharged within a fortnight or less, and if this were done (as by Banks and Mackenzie),[9] the number of complications which would occur in hospital would be very considerably reduced. Unless, however, all the cases were systematically followed up for some weeks after their discharge from hospital, no true indication of the number of complications could be obtained. The early discharge of patients suffering from scarlet fever has the advantage of minimising the risks of cross-infection, and all complications arising from this cause. In our own series, mild uncomplicated cases were usually discharged after 28 days, while complicated cases averaged a stay in hospital of seven to eight weeks. It is impossible to quote any figures which would be of use in illustrating the value of scarlatinal antitoxic serum in reducing the length of stay in hospital, as many mild non-serum treated cases of scarlet fever which are uncomplicated could be discharged after 28 days or even before. We can only give the opinion that with the routine use of antiscarlatinal serum the number of such patients is considerably increased.

In assessing the incidence of complications, the selection of "control" cases is most important, and constitutes a very difficult and almost an insoluble problem. Alternate cases used as controls are open to the objection that the control may be milder or more severe than the treated case. A chosen series of cases for many years is also of no value, as the type may be milder and the complications different in different years. A good example of the variation of one complication in different epidemics is given by the late C. B. Ker.[11] In 15,216 cases comprising three series, the percentage incidence of nephritis was 11·0, 5·64, and 8·75 respectively. Tables IVA. and V. show the variation in the incidence of complications in our own cases, (*a*) taking the first 500 and comparing them with the following 170, and (*b*) comparing the first 18 months with the second 13 months.

In a review of the literature on this subject, J. A. Toomey[12] very rightly attacks the whole question of

TABLE IVA.—*Serum-treated Cases.*

First 500 cases	(per cent.)	Following 170 cases (per cent.)
Adenitis ..	.. 13·2	10·0
Otitis ..	.. 5·6	7·0
Nephritis	.. 1·8	0·56
Relapse ..	.. 4·6	—

TABLE V.—*Serum-treated Cases.*

April to Sept., 1927. 18 months.		Sept., 1927, to Oct., 1928. 13 months.	
No. of cases	301.	No. of cases	369.
	per cent.		per cent.
Adenitis	7·6		16·2
Otitis	4·0		7·6
Mastoiditis	0		1·3
Albuminuria (including nephritis)	3·3		3·3
Nephritis	2·3		2·15
Rheumatism	1·6		1·9
Relapse	4·3		2·7
Total ..	23·1		35·15

inadequate control, and emphasises the importance of the great factor of variability in scarlet fever. It is not possible to include all the incidental, accidental, and variable factors necessary to select true "control" cases in scarlet fever. Such an accidental factor as crowding of wards in epidemics, leading to an increase in the number of complications, does not appear in published statistics relating to complications. At the Ilford Isolation Hospital during the period under review, 33 per cent. of the cases developed complications, as shown in Table VI.

TABLE VI.—*Complications in 670 Serum-treated Cases of Scarlet Fever.*

Nature of complications.	Cases and per cent.	Nature of complications.	Cases and per cent.
Adenitis	83 (12·4)	Suppurative adenitis	5 (0·7)
Albuminuria: Total (including nephritis)	22 (3·29)	Mastoiditis	5 (0·7)
Nephritis	15 (2·2)	Pneumonia and broncho-pneumonia	2 (0·3)
Otitis	40 (6·0)	Pharyngeal abscess ..	1 (0·15)
Rheumatism ..	12 (1·8)	Bronchitis	2 (0·3)
Relapse	23 (3·2)	Pyelitis	1 (0·15)
Rhinitis	58 (8·7)	Abscesses	2 (0·3)
Tonsillitis—		Peritonitis (and puerperal sepsis) ..	1 (0·15)
Total	19 (2·8)	Vaginitis	3 (0·45)
Suppurative ..	6 (0·9)		
Paronychia	28 (4·2)		

Mortality = 0·45 per cent. (exclusive of 1 case of puerperal fever).

Day of disease = day of rash.

Table exclusive of rhinitis, adenitis, and albuminuria at onset, and of complications following relapse.

Only one toxic case was treated and, although improvement was manifested for a time after large doses of scarlet fever antitoxin (180 c.cm. being given within three days) the patient succumbed from lobar pneumonia. A second death occurred in a woman admitted suffering from scarlet fever and puerperal fever. Inagglutinable hæmolytic streptococci were present in the throat and uterine cervix. The patient died after an operation for peritonitis.

Friedemann and Deicher[13] found hæmolytic streptococci in the pus of septic complications but not in the desquamation nor in the urine. Our own results confirm this, as hæmolytic streptococci were found in the nose, throat, and in the pus of septic complications, but not in the urine in cases of nephritis. It will be noted that, although antitoxic serum was administered on admission, yet suppurative complications occurred. These

TABLE VII.

Day of adminis. of anti-toxin.	Dose of anti-toxin.	Day of onset of otitis.	Dick test.	Day of onset of mastoid-itis.	Type of hæm. strep.		
					Fauces on admis-sion.	Pus from ear.	Pus from mastoid.
2	10	7	Neg.	14	Inag.	Neg.	Neg.
16	15	16	Pos. ¾	30	III.	III.	III.
2	20	6	,, ½	35	Inag.	Inag.	Neg.
1	10	39	,, ¾	54	,,	,,	Inag.
2	10	1	Neg.	51	Neg.	Neg.	Neg.
2 to 5	60	4	,,	5	III.	Staph.	III.
2 to 3	30	4	,,	5	II.	II.	II.
1	10	32	,,	35	I.	I.	I.
2	10	14	,,	42	III., I., & II.	Neg.	Inag.

included 40 cases of otitis media, 6 of suppurative tonsillitis, 4 of suppurative adenitis, 1 of suppurative adenitis followed by pharyngeal abscess, 2 of other abscesses, 3 of vaginitis, 28 of onychia, and 5 of mastoiditis. The cases of mastoiditis we have grouped in Table VII., and have included 4 cases of mastoiditis which occurred in 1929.

It will be observed from this table: (1) that the early administration of serum did not prevent the development of otitis media nor of mastoiditis; (2) that repeated doses of serum did not prevent the early onset of mastoiditis; (3) that the Dick test was negative six times out of nine when mastoiditis developed; (it was also negative six times out of seven at the onset of otitis media); (4) that the type of hæmolytic streptococcus when found was the same in the throat, ear, and mastoid. Apparently, therefore, routine treatment of cases of scarlet fever with antitoxin will not prevent suppurative complications. It is probable that in such cases the streptococcus has invaded the tissue and the antibacterial action of the serum is not sufficient to combat it. Ten of the 15 cases of nephritis occurred within the usual period, the second to the fourth week, while five were met with later. Thus the appearance of this complication is not delayed by treatment with antitoxin. Two cases of nephritis following relapses are not included in the total. Nephritis was rarely accompanied by pyrexia unless another complication was present at the same time—for example, adenitis. Œdema was limited to the eyelids. Neither diet, period of rest in bed, nor initial severity of the disease could be designated as causes of the nephritis. Incidentally, there appears to be no reason why scarlet fever patients should not receive adequate diet and get up as soon as their local and general conditions permit. It is doubtful whether repeated doses of serum would prevent nephritis. All we can say is that only one case out of over 200 has developed this complication since repeated doses of serum were used more widely. The Dick test was usually negative at the time of the clinical manifestation of the kidney condition, showing that uncombated toxæmia was not occurring in the body at that time. The following questions arise: when and how are the kidneys damaged? why are some cases singled out? and why does the incidence of nephritis vary so much in different years? It seems that in some individuals either (1) the glomeruli of the kidneys are very susceptible to damage by scarlet fever toxin, or (2) they are unable to secrete toxin at the ordinary rate, or (3) their kidney cells are unable to recover from toxic action, or (4) there is another factor present in addition to the initial toxæmia—e.g., acidosis. This is believed to be the cause of the condition by Berry[15] and Carter.[16] An acute recrudescence of nephritis in hospital appears to be rare.

Case No. 55/28, aged 6½ years, was admitted on the first day of a typical scarlet fever ordinary attack. 10 c.cm. of antitoxin were given and type 3 *S. scarlatinæ* found in faucial swab. On the 8th day he developed cervical adenitis, on the 13th day tonsillitis, and on the 14th day nephritis, which cleared up after 12 days. On the 56th day the patient was up in ward; on the 79th day he had rhinitis with a *S. scarlatinæ*, type 2. On the 83rd day he developed nephritis, but with no streptococci in the urine. He recovered.

Immunity in Convalescence.

We have previously expressed our view on the effect of scarlatinal serum in increasing the number of Dick-positive reactors during convalescence in scarlet fever.[17] This has since been confirmed by Brown.[18] We also considered this question in relation to the incidence of relapses. Table IV. shows that, whereas in the first 500 cases in which no special precautions were taken the relapse rate was 4·6 per cent., no relapse occurred in the last 170 cases when the precautions mentioned in our previous article were taken. As in the cases described by Griffith and Gunn,[7] the relapses occurred in Dick-positive cases. Unfortunately in only one of the relapses were we able to obtain hæmolytic streptococci in the fauces, both in the primary infection and in the relapse, and in this case the organism, in both instances, was inagglutinable.

D. S. Sutherland[19] has reported on the value of the active immunisation with scarlet fever toxin of Dick-positive reactors convalescent from scarlet fever. This method was tried by us in 56 cases which gave a Dick-positive result at the end of the third week of disease. Of these cases one showed hæmolytic streptococci on admission to hospital and three had mixed types of streptococci; of the remaining 53, 26 (49 per cent.)

were converted from Dick-positive to Dick-negative reactors before their discharge. The average dosage of scarlet fever prophylactic employed was 500, 1000, 2000, 2500, 3750, and 5000 units at weekly intervals. Some of the cases remained in hospital only two weeks from the time of the first dose. These might have been converted if they had had the full course. Nineteen cases were converted to negative after one dose in seven days; one case after two doses in 14 days; three cases after fourteen doses in 21 days, and of the remaining three cases, one was converted after nine doses in 70 days. (This was a case of mastoiditis which had been operated upon.) The Dick-positive reaction became fainter with succeeding doses of the prophylactic. The classification of the cases according to the type of organism concerned is given in the following table.

Type.	I.	II.	III.	IV.	Inag.	Total.
Converted.. ..	3	4	1	1	17	26
Not converted ..	2	2	1	3	19	27

Little can be deduced from this table owing to the small figures, but the cases infected with type 4 appear to be less readily rendered immune than those infected by other types. Twenty-one of the cases had or developed complications; 47·9 per cent. of these were converted. Two of type 4 complicated cases were not converted. We have formed the opinion that, although it is possible to convert convalescent patients who are Dick-positive reactors to Dick-negative reactors by a course of injections of scarlatinal toxin, yet the proportion of cases so converted within a short period of time is insufficient to be of administrative value—that is, it is not of value for the prevention of reinfection during the further stay in hospital. We consider that the more practical method is either to isolate such cases or to immunise them passively after desensitisation with anti-scarlatinal serum.

The Effect of Serum Treatment on Complications.

Although we do not suggest that it is in any way an adequate control, we have compared in Table VIII. the percentage of complications in 517 consecutive cases admitted during 1922–25 with our present series.

TABLE VIII.—*Ilford Isolation Hospital.*

—	April, 1926–October, 1928.	1922–1925.
	Serum-treated 670 cases (per cent.)	Non-serum treated 517 cases (per cent.)
Adenitis	12·4	21·8
Albuminuria ..	3·29	8·7
Otitis	6·0	9·7
Rheumatism ..	1·8	5·8
Total percentage..	23·49	46·0

The control is of some value in that our present series consists of cases occurring during an epidemic period when scarlet fever was of a severer type than in the preceding three years. It will be noticed that the reduction in the incidence of complications is most marked in rheumatism, a toxic condition, and least marked in otitis, a septic condition. After a careful scrutiny of the 223 complicated cases we have not been able to establish the thesis that the day of disease on which serum is given influences the incidence and day of onset of complications in scarlet fever. This work does not support the view advanced by McLachlan and Hunter,[20] Scott,[21] and Craig,[22] that the earlier the serum is given the less the incidence of complications. In our opinion there are other factors determining whether a case will be a complicated one or not. Possibly it is not a question of "days" after the appearance of the rash, but the period prior to the exanthem or at its actual onset when the streptococcus is enabled to penetrate before antibacterial resistance is developed. Table IX. is an analysis of the complications with the day on which the serum was given and the number of times the complication occurred.

TABLE IX.

Day serum given.	Suppurative adenitis.	Rhinitis.	Otitis.	Nephritis.		Rheumatism.		Relapse.	Tonsillitis.	Supp. tons.	Onychia.	Mastoiditis.	Pneumonia.	Pharyngeal abscess.
				2–4 weeks.	Later.	Early.	Late.							
1st	3	19	12	3	—	2	3	3	3	—	8	1	1	1
2nd	—	21	13	—	1	2	—	13	5	1	10	3	1	—
3rd	1	9	7	4	—	—	1	4	2	3	6	—	—	—
4th	1	5	2	1	1	2	2	3	1	1	1	—	—	—
5th and over.	—	4	6	2	3	—	—	—	2	1	3	1	—	—

A suggestion has been made that complications in cases of scarlet fever are delayed and not prevented by the use of scarlatinal antitoxin.[24] The administrative procedure as regards routine day of discharge from hospital will influence the number of delayed complications. In some hospitals all clean cases are discharged at the end of four weeks or before; in others not until the sixth week. Therefore any complication arising in hospital in a previously uncomplicated case after the twenty-eighth day might be classified as a delayed complication. McLachlan and Hunter[20] in serum-treated cases have recorded 3·75 per cent. with complications (excluding debility) occurring primarily after discharge from hospital; in addition, 6·6 per cent. recurring after discharge from hospital, a total of 10·35 per cent.

In a series of 500 non-serum treated cases followed up at Bristol, 12 per cent. of cases suffered from complications after discharge from hospital.[14] The fallacy in collections of figures of this kind is that—apart from cases actually seen by a medical practitioner after discharge—the report is based on the history given by patients or parents. Even so, our series of serum-treated cases does not compare unfavourably with non-serum treated ones. 557 of the serum-treated cases discharged from the Ilford Isolation Hospital were investigated (313 by medical officers and 244 by sanitary inspectors). 10 per cent. of the cases developed complications after discharge, of which 2 per cent. were recurrences of conditions arising in hospital.

Number of Times Complications Occurred.

Rhinitis	21	Pleurisy	1
Otitis	11	Heart	3
Rheumatism	7	Chorea	1
Nephritis	4	Onychia	2
Adenitis	2		

After relapses in hospital two cases had recurrence of rhinitis; one developed a primary otitis and one a primary otitis and nephritis, one endocarditis, and one rheumatic fever after discharge. The figures exclude anæmia and debility.

Results and Conclusions.

1. Out of 265 cases, 191, or 79 per cent., on admission showed hæmolytic streptococci in their fauces.

2. Of the hæmolytic streptococci in the above series, 46·1 per cent. of the cases could be classified under one of Griffiths' groups, the remaining 53·9 per cent. being inagglutinable with the type sera. Certain of these strains became agglutinable on repeated subculture.

3. In view of the large percentage of inagglutinable hæmolytic streptococci, it is impossible accurately to correlate the type of streptococcus with the clinical type of scarlet fever. As far as our present knowledge

goes, however, type 4 appears to be the least virulent, and type 2 the most virulent of the typeable streptococci.

4. In 24 complications a hæmolytic streptococcus was found both in the fauces and at the site of the complication; in ten cases the type was different in the latter to the former. This appears to indicate cross-infection with a different type of streptococcus. In view of the presence of inagglutinable strains of streptococci and the possibility of an original mixed infection, no dogmatic statement can be made at present.

5. The results of routine treatment of cases of scarlet fever with antiscarlatinal serum are good, but do not compare with the use of antidiphtheritic serum in diphtheria. Our experience does not bear out the statement of Toomey and Dolch[8] that serum sickness is usually more severe than the disease itself. Such evidence as we have at our disposal indicates that antiscarlatinal serum markedly reduced the number of toxic complications. It also reduces the number of septic complications, but not so markedly. It does not delay the onset of complications.

6. Modern investigations show (*a*) that there is a considerable proportion of Dick-positive reactors in convalescent scarlet fever patients, (*b*) that the number is increased in cases treated with antiscarlatinal serum, (*c*) that there is a certain amount of evidence that cross-infection with different types of hæmolytic streptococci occurs, (*d*) that hæmolytic streptococci persist longer in the throats of patients nursed in hospital than they do in cases nursed at home.[23] We are of the opinion that the present system of nursing scarlet fever patients in general wards will ultimately have to be discontinued, and, if such patients have to be removed to hospital, they will require to be treated in cubicle wards at least until their immunity and—when our knowledge is a little more advanced—their type of infection can be accurately determined.

7. The active immunisation of convalescent scarlet fever patients who are Dick-positive with scarlatinal toxin is not a satisfactory solution of the administrative problem of dealing with such cases.

References.

1. Dick, G. F., and Dick, G. H.: Jour. Amer. Med. Assoc., 1923, lxxxi., 1166; ibid., 1924, lxxxii., 265, 301, 1246; ibid., 1925, lxxiv., 803; lxxxv., 1693.
2. Smith, J.: Jour. Hyg., 1926, xxv., 165; ibid., 1927, xxvi., 420.
3. Griffith, F.: Jour. Hyg., 1926, xxv., 385; ibid., 1927, xxvi., 363.
4. James, G. R.: Jour. Hyg., 1926, xxv., 415.
5. McLachlan, D. G. S., and Mackie, J. T.: Jour. Hyg., 1928, xxvii., 225.
6. Gunn, W.: Ann. Rep. Met. Asylums Board, 1927, p. 177.
7. Gunn, W., and Griffith, F.: Jour. Hyg., 1928, xxviii., 250.
8. Toomey, J. A., and Dolch, E. G.: Amer. Jour. Dis. Child., 1928, xxxvi., 1173.
9. Banks, H. S., and Mackenzie, J. C. H.: THE LANCET, 1929, i., 381.
10. Rolleston, J. D.: Acute Infectious Diseases, London, 1925.
11. Ker, C. B.: Infectious Diseases, 2nd ed., London, 1920.
12. Toomey, J. A.: Med. Officer, Dec. 15th, 1928, p. 257.
13. Friedemann, U., and Deicher, H.: Deut. Med. Woch., 1926, li., 2147.
14. Rept. Pub. Health and Med. Subjects, 1927, No. 35.
15. Berry, E. H. J.: THE LANCET, 1927, ii., 858.
16. Carter, H.: Ann. Rept. Met. Asylums Board, 1927, p. 195.
17. Burton, A. H. G., and Balmain, A. R.: THE LANCET, 1928, i., 1060.
18. Brown, W.: Brit. Med. Jour., 1929, i., 13.
19. Sutherland, D. S.: THE LANCET, 1927, i., 291.
20. McLachlan, I. M., and Hunter, J. W.: Med. Officer, 1928, xxxix., 75.
21. Scott, J. A.: THE LANCET, 1928, i., 124.
22. Craig, J. C. B.: THE LANCET, 1928, ii., 1123.
23. Friedemann, U., and Deicher, H.: Deut. Med. Woch., 1927, p. 1163.
24. Med. Officer, 1928., xxxix., 47.

QUEEN'S HOSPITAL FOR CHILDREN.—This hospital of 134 beds last year received 1818 in-patients. Their average stay was 24 days and their cost £11 1*s.*; the 32,708 new out-patients cost 5*s.* 8*d.* each. The Bexhill Home received 183 in-patients at a cost of £13 14*s.* 10*d.* each. The hospital has an arrangement with the London County Council for the dental treatment of school-children, and is one of the largest centres in London for such cases. Towards the income of £33,514 patients contributed £5927, but there was a deficit of £722.

Clinical and Laboratory Notes.

DIAGNOSIS AND TREATMENT OF ANÆMIA IN SCHOOL-CHILDREN.

WITH SPECIAL REFERENCE TO THE HÆMOGLOBIN CONTENT OF THE BLOOD.

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THIS investigation was begun in January, 1928. At first nothing more was done than to record on the medical card of each child the hæmoglobin content of the blood on admission and on discharge from the open-air school. The great majority of children admitted to this open-air school belong to that group of subnormal physical health usually labelled "malnutrition and anæmia," or "pretuberculous," and there are thus few definite physical signs other than pallor, perhaps palpable cervical glands, and anatomical unfitness in weight or build, together with a history either of recurrent illness, often vague in character, or of living or having lived in association with a relative suffering from tuberculosis. Often a combination of these facts is reported.

To estimate the hæmoglobin von Fleischl's hæmometer was used. In order to compare the figures with those of other investigators the apparatus was tested against Haldane's hæmoglobinometer, which appears to be the most commonly employed, but which could not be used in this experiment as there is no coal-gas at the school. Ten persons were tested by both methods and, excluding three cases where there was recognisable technical error—viz., in completely filling the Haldane capillary tube—the results were: four cases gave identical readings; two cases gave readings 2½ per cent. higher with von Fleischl's apparatus; and one case gave a reading 1½ per cent. higher with von Fleischl's apparatus.

If a reading on von Fleischl's apparatus were (e.g.) above 50 but below 55 it was called 52½. Thus the results indicate that the two methods give closely related values. A dark room and an electric lamp of the same power were always used with von Fleischl's apparatus.

The Normal Hæmoglobin Percentage.

Some difficulty is felt in deciding what the normal percentage of hæmoglobin is in a "healthy" child. S. C. Dyke[1] has stated that "whatever method of estimating hæmoglobin is used the percentage in normal people (evidently adults) is below 100." He goes on to say that 80 to 105 may be regarded as being within normal limits, 60 to 80 as showing anæmia, and that figures below 60 indicate need for treatment.

In the course of the present inquiry the hæmoglobin was estimated in 45 children who were said to be "well"—i.e., they were not receiving medical attention and were attending regularly an elementary school in the centre of the town. Table I. gives the figures in this control group and in the first group of 55 children examined at the open-air school. The latter when tested had already been in the open-air

TABLE I.

Hæmoglobin (per cent.).	Control group (No.).	45 children (per cent.).	Open-air school group (No.).	55 children (per cent.).
Below 40	0	—	0	—
40– 50	1	2·2	1	1·8
51– 60	3	6·6	10	18·0
61– 70	11	24·4	23	41·8
71– 80	12	26·6	11	20·0
81– 90	13	28·8	8	14·5
91–100	3	6·6	0	—
101–105	2	4·4	0	—
106–110	0	—	1	1·8
111–115	0	—	1	1·8
116–120	0	—	0	—
Total	45	99·6	55	99·7

[1] Dyke, S. C.: THE LANCET, 1928, ii., 936.

school for about three months. Both groups are composed of approximately equal numbers of boys and girls, and the ages are similar.

This table shows that in the control group the majority (36 children) give hæmoglobin estimations between 61 per cent. and 90 per cent., while in the open-air school group the majority of the children (44) give estimations between 51 per cent. and 80 per cent. —i.e., the subnormal group of children have hæmoglobin values about 10 per cent. lower than those of the healthy children. Again it is evident that whereas in the control group 32·2 per cent. of the children give readings of 70 per cent. or lower and 66·4 per cent. higher readings, almost exactly the reverse is true for the open-air school-children, since 61·6 per cent. of these children give readings of 70 per cent. or lower and 38·1 per cent. only give higher readings. This suggests that the line of demarcation between health and ill-health might be placed at about 70 per cent.

Results of Attendance at Open-air School.

By Easter, 1929—at the end of four terms during which this work has been carried out—it was observed that between 50 and 60 per cent. of all the children admitted to the open-air school gave a higher hæmoglobin value, whatever their original figure, when tested before discharge from the school. Table II. gives the details for the first 55 children who were discharged; they are the same children as in the first table.

TABLE II.

Hæmoglobin estimation.	No. of children.	Per cent.
Increased	31	56·3
Unchanged	6	10·9
Decreased	18	32·7
Total	55	99·9

This percentage of improvement remained fairly constant for the children who were discharged each term, although the time spent in the school varied in individual cases by as much as one year. It is a day open-air school where the children remain from 9 A.M. until 4.30 P.M. in winter and 5.30 P.M. in summer; dinner and tea are provided, also milk at 10.15 A.M. It should be noted that all the children improve in physical fitness as judged by improved general appearance and increased muscle tone, appetite, weight, and activity.

Result of Administering Iron.

As the result of dissatisfaction with the relatively low improvement rate in the children's hæmoglobin values, it was decided to administer iron, following the lines of the work done by Dr. Helen Mackay,[2] adopting provisionally as normal the figures 80 per cent. to 105 per cent. The children to whom iron was to be given were selected as follows: Eighteen children were picked out by the school nurse as not having improved in general condition, in her opinion, in spite of fairly regular attendance for between 6 and 12 months. All but 4 of these gave hæmoglobin figures under 80 per cent., but 11 (61 per cent.) gave a higher reading than on admission, thus falling in with the improvement percentage found each term in the children discharged. The 14 children with hæmoglobin values below 80 per cent. were given iron, and are known as the "special" treated group. Of 82 other children in the school at that time, 51 had hæmoglobin values under 80 per cent.; the first 25 in alphabetical order of this 51 were given iron and the remaining 26 were not given iron, in order to form a control group. In all, 39 children received iron.

The mixture given was iron and ammonium citrate in chloroform water. The selected children were given two doses daily after meals, those over 10 years of age receiving a total of grs. 15 daily and those under 10 a total of grs. 7½ daily. This medicine was given five days weekly for ten weeks. There were a few complaints of constipation but none of indigestion. Clinically there was no striking improvement in the colour of skin or mucous membrane.

[2] Mackay, H. M. M.: Arch. Dis. Child., 1928, iii., 117.

The results, which are surprising in view of Dr. Mackay's work, are given in Table III. Only 33 of the original 39 who were given iron were available for the final estimation, and the control group also became smaller in number owing, in both groups, to absence from school during the period of experiment.

TABLE III.

Hæmoglobin estimation.	"Special" treated group.		Unselected treated group.		Control group.	
	No.	Per cent.	No.	Per cent.	No.	Per cent.
Increased ..	1	8·3	6	28·5	5	29·4
Unchanged ..	4	33·3	3	14·3	4	23·5
Decreased ..	7	58·3	12	57·1	8	47·1
Total ..	12	99·9	21	99·9	17	100·0

The numbers are small but clearly indicate that iron administered as described has had no significant effect on the hæmoglobin content of the blood in subnormal children, most of whom are pallid and debilitated, are described by clinical observers as "anæmic," and give a confirmatory reading on von Fleischl's hæmometer, This result contrasts strikingly with the observation that between 50 and 60 per cent. of the children admitted to the open-air school give a higher hæmoglobin estimation on discharge than on admission without being given an iron tonic.

Summary.

1. Hæmoglobin estimations were made in children on admission and on discharge from an open-air school.

2. The apparatus used to estimate the hæmoglobin was von Fleischl's hæmometer, which was compared with Haldane's hæmoglobinometer, and the difference in the figures given by the two instruments was found to be small.

3. A number of healthy children were tested to try to find the "normal" hæmoglobin value in children.

4. It was observed that between 50 and 60 per cent. of the children gave higher hæmoglobin readings on discharge than on admission to the open-air school.

5. Iron was administered in an attempt to obtain a higher number of increased hæmoglobin estimations. The effect was negligible.

These observations were made and published with the approval of Dr. R. M. F. Picken, medical officer of health.

THE ACTION OF EPHEDRINE IN RELIEVING CERTAIN PAINFUL ACCOMPANIMENTS OF LEPROSY AND LEPRA REACTION.

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THE treatment of leprosy does not end with the administration of some product of hydnocarpus oil, but must take within its scope the treatment of numerous complicating factors. These complications are frequently more trying than the disease itself. It is here that ephedrine has been found useful.

The first use of ephredine with which I wish to deal is its employment for the relief of the painful complications of lepra reaction. These are mainly, 1. Nerve pain. 2. Painful swellings of soft tissues. 3. Joint pains and headache. In previous communications to medical journals,[1 2 3] the power of ephedrine to relieve such distressing symptoms has already been demonstrated. The following illustrations afford further confirmatory evidence.

CASE 1.—An Indian male, aged 30. Advanced skin leprosy (B_2–B_3 Muir's classification). Complained of headache and pain all over the body; this was associated with fever ranging from 101°–103° F., and also with the eruption of fresh nodules on both arms. Ephedrine gr. ½ by mouth

was given. Within 15 minutes pain and headache were relieved. As fever had persisted for three days 0·02 g. potassium antimony tartrate was given every other day for one week, and the temperature gradually came down to normal.

CASE 2.—An Indian male, aged 35. (Mixed case, $B_2.A_2$.) Complained of much fever, nerve and joint pain; gr. ½ ephedrine in 1 drachm of water was administered. Within 15 minutes patient said the pain "had been miraculously relieved." Again pot. antim. tart. 0·02 g. was administered, and on second injection temperature returned to normal. On previous occasions patient stated he "had to suffer six weeks of fever."

CASE 3.—A male, aged 14. (B_3.) Complained of local swelling and pain on right side of face associated with fever coming on 12 hours after injection of 4 c.cm. Alepol. Ephedrine gr. ½ in 4 c.cm. of saline was injected subcutaneously. Pain disappeared almost at once and swelling subsided within 24 hours.

These cases once again illustrate that this drug has a powerful effect in alleviating some of the complications of lepra reaction. Chronic leprosy, however, brings certain painful sequelæ in its train. Therefore it was considered worth while to give ephedrine a trial. The conditions in which the drug was tried were: 1. Nerve pain of a persistent character unaccompanied by fever. 2. Burning and gnawing pains in joints of bones. The former type of pain is probably due to pressure of the contracting fibrous tissue in the nerve sheath, and therefore any relief can only be expected to be transient. The severe bone pains which occur are probably of a trophic nature. The following illustrate the result of ephedrine in such cases:—

CASE 4.—A Hindu female. (Mixed $A_1.B_2$.) Complained of constant gnawing pain in the internal cutaneous nerve of the forearm. The nerve was felt as a thick fibrous cord for about 4 inches, below the elbow. Ephedrine hydrochloride had been given orally with no relief. Half a grain of the drug in 4 c.cm. of saline was then injected underneath and along the course of the nerve. Pain diminished within half an hour, and the patient was comfortable for the next three days. About a week later pain recurred and the injection was repeated, again giving temporary relief. As the pain continued to recur, and because the nerve was so thick, an operation was considered necessary. Under a local anæsthetic about 4 inches of the medial cutaneous nerve of the forearm was exposed and freed from its sheath. The wound was then closed without drainage. The wound healed by first intention and gave permanent relief from pain up to the time of writing.

CASE 5.—A female. Advanced skin type, aged 30. (B_2.) Complained of gnawing pains along the course of the peroneal nerve, until the patient stated that she was unable to sleep. On March 3rd, 1929, gr. ½ was given orally with no relief. On March 5th gr. ½ ephedrine in 4 c.cm. saline was given subcutaneously along the course of the peroneal nerve. Pain diminished to a great extent in 20 minutes, and did not recur until March 26th. On this occasion the injection was repeated and again gave some relief. An operation would in all probability give permanent relief if patient would consent.

CASE 6.—Hindu male, aged 35. Advanced mixed case. ($B_3.A_2$.) Complained of very severe burning pains in hands and feet. Ephedrine gr. ½ orally gave no relief. Half a grain in 4 c.cm. saline subcutaneously gave relief within half an hour and pain did not recur for several days. On a repetition of the injection pain was again relieved.

CASE 7.—Hindu male, aged 45. Advanced nerve case (A_1–A_2.) Complained of aching in bones of dorsum of foot and hand; bones were markedly tender to pressure. As the patient was strong and healthy it was decided to inject ephedrine intravenously. Because all veins except those in the dorsum of the foot had become blocked the drug was injected into this situation. Relief was marked within 15 minutes, and the tenderness and pressure disappeared. The heart's action was markedly increased in force, but not so greatly in frequency, and a systolic bruit appeared which disappeared in half an hour when the action of the drug passed away.

Conclusions.

From this short series of cases it can be concluded that ephedrine by mouth gives almost instantaneous relief in nerve pains, &c., that accompany leper fever. I could not confirm Green's[2] conclusion that it influenced the pyrexia. For apart from pot. antim. tart. I noticed no effect, and concluded that it was this drug that controlled the fever.

In pains which accompany chronic leprosy ephedrine given subcutaneously, or, if the patient is strong and healthy, intravenously, is worth a trial. For nerve pain of the type described, operation must be eventually resorted to. For bone and joint pain which is so distressing then ephedrine appears to give temporary relief, and therefore is worthy of a trial.

I have to thank Prof. B. E. Read, of Peking, for further supplies of ephedrine hydrochloride, without which this investigation could not have been undertaken.

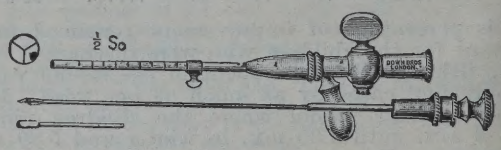
References.

1. Muir, E., and Chatterjee, S. P.: Indian Med. Gaz., 1929, lxiii., 198.
2. Green, R.: Trans. Roy. Soc. Trop. Med. and Hyg., xxii., No. 4, January, 1929.
3. Cochrane, R., and Mittra, P.: China Med. Jour., 1928, xlii., 697.

New Inventions.

A PNEUMOTHORAX INDUCTION TROCAR AND CANNULA.

IN the induction of pneumothorax with the Riviere trocar and cannula it is necessary to push the instrument down as far as the parietal pleura, withdraw the trocar, and then push the blunt cannula through the membrane into the potential pleural space. This method is advocated in order to avoid damage to the underlying lung. In practice we have found that it is unsatisfactory because considerable pressure is required to push the cannula through the membrane; the parietal pleura tends to be stripped off the ribs and there is a possibility of damage to the pleura and subsequent pleural shock. Further, if the pleura is not sufficiently anæsthetised the procedure



causes a considerable degree of pain. We have found that the best way to use the Riviere induction needle is to penetrate the parietal pleura with the sharp trocar which is then withdrawn. If the end of the cannula is in the pleural space, the manometer shows wide negative respiratory fluctuations. If not, the trocar has to be reinserted and further search for the pleural space ensues. The disadvantages of this method are: (1) if the end of the trocar projects much beyond the end of the cannula there is a possibility of piercing the lung; and (2) it is necessary to withdraw the trocar in order to see the manometric fluctuations. In order to overcome these difficulties, we have modified the Riviere induction trocar, as will be seen from the figure: (*a*) The point of the trocar is made to project as little as possible beyond the end of the cannula. (*b*) The trocar is grooved from its point to where the shaft is seen to be narrowed. The narrowing of the shaft is continued as far as where it corresponds to the cannula's side projection to which is attached the rubber tubing going to the manometer and the air reservoir. (*c*) The cannula does not have the lateral aperture which is a feature of the Riviere needle. The result of these modifications is that there is a continuous air space from the point of the needle to the manometer. Manometric fluctuations are set up as soon as the point of the needle enters the pleural space. The very short point of the needle practically precludes the possibility of damage to the lung. If necessary, air can be injected without withdrawing the trocar. The abolition of the lateral aperture does away with the possibility of air being injected at the same time into the tissues of the chest wall.

The instrument has been made for us by Messrs. Down Brothers, St. Thomas's-street, London.

A. I. GRANVILLE MCLAUGHLIN, M.B.
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BRITISH MEDICAL ASSOCIATION.

ANNUAL MEETING IN MANCHESTER.

(*Continued from p. 501.*)

SECTION OF NEUROLOGY.

THE EPILEPSIES.

Dr. JUDSON BURY (Manchester) presiding, Dr. S. A. KINNIER WILSON (London) opened the discussion with a paper entitled Some Aspects of the Problem of the Epilepsies. He said he was under no delusion as to the complexity and intricacy of the subject. Were epilepsy not so involved a problem it would long ago have received at least a working interpretation, but the truth was that the condition defeated us on many grounds; its ætiology was heterogeneous, its semiology was indeterminate, its pathology dubious, and its therapeutics empirical. For the purposes of the discussion he could only single out one or two aspects to which attention might be usefully directed. They had been chosen intentionally as best calculated to indicate the range of the problem connected with the epilepsies.

1. *Clinical Features of Epileptic States.*

The first difficulty arose from the clinical polymorphism of epileptic phenomena. A major epileptic fit, when seen, was readily diagnosed, but the epileptic state was by no means confined to major seizures. Motor, sensory, psychical, and visceral variants all existed. We had also to consider the pre-seizure and post-seizure disorders. In taking a wide and psychogenic view of the question, the following points were to be remembered: (1) The epileptic aura was a sensation and thus a symptom belonging to the psychical series; it was something in consciousness. Herpi had long ago emphasised the hallucinatory nature of the phenomenon. (2) Interruption of the stream of consciousness might or might not accompany epileptic manifestations. Absolute unconsciousness might supervene without aura, but many fits ran their course with conservation of consciousness. (3) The motor condition of the fit usually consisted of convulsive movements. On the other hand, the whole of the motor phenomena might consist in mere flickers of a finger and thumb, quivering facial contractions, or a momentary spasm—even the absence of movement. (4) The sensory elements of a seizure, apart from the aura symptoms, constituted the whole attack. In many instances the aura was not followed by an attack. (5) The visceral components included circulatory, respiratory, vasomotor, rectal, renal, vagal, pupillary, and other phenomena. (6) Post-seizure manifestations embraced varied sets of opposites, from sleep to fugues, stupor to combativeness, speedy recovery to prolonged fatigue. All these phenomena emphasised the heterogeneous nature of epileptic manifestations.

2. *Inheritance of Epilepsy.*

Twenty-one years of practice and hospital experience had convinced Dr. Wilson that the hereditary factor was persistently overrated and the personal, or constitutional factor, underrated. The number of cases in which no hereditary element could be traced far exceeded that in which such a factor seemed responsible. Statistics were quoted by Dr. Wilson to support this contention. He considered that it was impossible to draw any other conclusion than that direct hereditary was of little moment in comparison with other inducing factors.

3. *Experimental Production of Convulsions.*

On the experimental side, normal animals could be made to develop convulsions with ease and certainty. Whatever the provenance of laboratory animals, they were also potentially capable of developing epilepsy. Study of methods revealed two main technical procedures for the production of convulsive states. These might be classed as (1) humoral, and (2) neural. These might act separately or interrelatedly.

(1) The *humoral* factor might be defined comprehensively as that component in the production of experimental epilepsy which consists in alteration of the body fluids and biochemical constituents, either mechanically or in connexion with exogenous or endogenous noxæ. Certain general conclusions recently arrived at by Lennox and Cobb showed that: (1) acidosis tended to inhibit, and alkalosis to augment seizures; (2) an increased tension of oxygen in the tissues tended to inhibit and a decreased tension to augment seizures; (3) œdema of the brain tended to increase, and dehydration to diminish seizures. Although these generalities merited attention the modes of action of the various factors had not been satisfactorily determined, and the separateness of their functions was not established. In other words, we were not in a position to say that the mechanical and the toxic components were always in essence contrasted or in their effect mutually and invariably independent.

As for the *neural* mechanism, it had been known for years that direct excitation of neural centres could result in the development of unilateral or generalised epileptic attacks.

4. *Occurrence of Convulsions in Pathological States.*

If the deductions of the experimentalist in respect of epileptic determinants were to prove of value they must be capable of substantiation from the clinical side—that is to say, there must be evidence that these, or some or other of these, played a part in the production of epileptic syndromes under pathological circumstances. Taking neural conditions first, we recognised a large number of diverse organic cerebral states in which epilepsy in one or other form made its appearance: (1) Cerebral tumours; (2) cerebral infections and toxic infections—e.g., encephalitis, syphilis; (3) cerebral toxic degenerations or scleroses (disseminated sclerosis, &c.); (4) cerebral trauma; (5) certain varieties of congenital and heredo-familial disease.

Humoral and vascular cerebral pathological conditions were: (1) disease of blood-vessels (thrombosis, arterio-sclerosis, &c.); (2) disorder of cerebral circulation (heart-block, anæmia, &c.); (3) disorder of cerebro-spinal fluid (hydrocephalus).

5. *Mechanism of Production of the Epileptic Seizure.*

The information garnered from the preceding sections could be summarised as implying the existence of three or four determinants for the production of epileptic phenomena.

1. *Mechanical Determinant.*—It had for many years been suspected, and often argued, that some connexion existed between the epileptic state and increase in amount and pressure of cerebro-spinal fluid; and the view had often been expressed that a relation could be established between the occurrence of the latter and failure in fluid absorption owing to arachnitis or other pathological local condition. Dandy, Fay, and Foerster had shown the existence of enlarged subarachnoid spaces more especially over the vertex and fronto-parietal regions; while, pathologically, subarachnoid collections of fluid, local œdemas, and such-like conditions had often been seen. Fay had recently added to our knowledge of this particular mechanism by his examination of the Pacchionian bodies in chronic epileptic brains, and had found various stages of sclerosis, calcification, atrophy, failure of development, and other abnormalities in these organs in epileptic subjects.

2. *Vascular Determinant.*—The consensus of opinion held that cerebral and general pallor or anæmia was more or less constantly visible to the eye just as the seizure commenced. This circulatory derangement or disorder was confirmed by the frequent observation of failure of the peripheral pulse at the outset, and the rarer one of constriction of retinal arteries at the

same moment. In 1903 the circulatory steps were epitomised by Hare as follows: (1) vasoconstriction; (2) cardiac inhibition (vagal); (3) sudden cerebral anæmia, causing unconsciousness and tonic spasm; (4) recommencement of the heart-beat causing rise of pressure, returning cerebral circulation, relaxation of tonic spasm, and clonic convulsions; (5) Re-establishment of blood pressure and cerebral circulation; cessation of convulsions. What was the proximate cause of the sudden initial vascular constriction? And where did it start? To the former question no satisfactory answer was as yet forthcoming. We did not know whether the vasomotor change began in the vasomotor centre of the bulb, or locally in the cerebral cortex, or distally, by way of reflex influence on the medulla or cortex.

3. *Humoral Determinant.*—The humoral or physiochemical determinant had received an immense amount of attention in recent times. Briefly, it must be considered as established that a number of conditions (hyperventilation, injections of various chemical substances, anoxæmia variously produced) caused experimentally a marked fall of O_2 tension in the tissues and were calculated to give rise to convulsions. "Contraction of cerebral vessels" remained unexplained. Lennox and Cobb, it was satisfactory to observe, were aware of the hiatus, for they admitted that "these processes are only contributory; they may be effective only in persons with a tendency to seizures, and with those having some pathology either in the brain, the body, or the emotional life."

4. *Neuronic Determinant.*—We were, therefore, brought back to the position which for some was still unassailed, that the essence of all epileptic semiology, major or minor, pre-seizure or post-seizure, psychical or visceral, was neuronic derangement, and that this derangement was of neuronic derivation. Nervous tissue could be, and was often enough, influenced by mechanical, vascular, and humoral agencies; but the secret of epilepsy—the core of the problem—resided in the qualities of the neural mechanisms exhibiting discharge.

The following considerations must be given due weight:—

1. The action of convulsants such as absinthe, producing fits in a normal animal, was much facilitated if the animal underwent any cerebral injury.
2. Single humoral or vascular factors, by themselves, were often insufficient to produce fits.
3. Only a small percentage of cases with head injuries and with histories of infective and other conditions reacted with fits.
4. The development of epilepsy in some organic brain states was in favour of a neural factor, seeing that no evidence of vascular or humoral anomalies was forthcoming in them.
5. A "susceptibility" or "tendency" could scarcely be ruled out in cases of direct heredity and of epilepsy in homologous twins.
6. The clinical occurrence of so-called reflex epilepsy strongly suggested a pure neural reaction.

It was therefore impossible to find one single common factor for the totality of epileptic manifestations, unless the significance of some inherent nervous factor, some functional propensity, was allowed. The only trouble was that at present we could not gauge "susceptibility" by reference to objective criteria.

6. *Influence on Epileptic Semiology of Other Intercurrent Affections.*

This, perhaps, deserved more attention than had hitherto been accorded it. As long ago as 1882 it was noticed by Bourneville and Bonnaire during an epidemic of measles in epileptics and idiots at the Bicêtre that while the intercurrent affection lasted fits were much decreased in force and frequency, and similar observations were recorded by Seglas.

So far as Dr. Wilson had discovered no attempt had been made by Gowers or any of the other authors mentioned to explain the way in which this influence may be, theoretically, exerted. According to Hare, however, it was the pyrexia which was of significance, for it involved general vascular relaxation, and he argued that vasodilatation was similarly of value in cutting short attacks of both asthma and migraine. Whatever the explanation, it might yet turn out to be of importance from a pathogenic and a therapeutic standpoint that epileptic manifestations were sometimes controlled by Nature's own methods.

Myoclonic and Traumatic Epilepsy.

Dr. J. J. L. MUSKENS (Amsterdam) considered that it was possible to recognise at least two definite clinical entities among the many forms and variations that epilepsy might present.

1. *Myoclonic Epilepsy.*—The condition of myoclonic epilepsy consisted of the syndrome of headache, myoclonic jerks, and myoclonic fits—i.e., fits tantamount to genuine epileptic fits—whether these symptoms appeared in rapid succession or only after a lapse of years. In some cases headache might be the only symptom followed after some years, as many as ten, by myoclonic jerks, while again, after a lapse of years, "fits" appeared. In some cases the development of the complete clinical picture was more rapid, while in others the symptoms were not all present or varied greatly in severity. It was not until work involving the experimental administration of drugs such as camphor bromide demonstrated in the cat and the dog the close relationship between the tactile and acoustic myoclonic reflex and the complete epileptic fit. In the lower animals, as in man, the myoclonic jerks and epileptic fits merged into one another, while in both there appeared the same time of selection for the appearance of fits—viz., the time of transition from sleep to wakefulness, or from wakefulness to sleep. Among some 3000 epileptics Dr. Muskens had found several cases in which simple syncope was frequent just before the appearance of the fit, and transitional states between syncope and seizure were occasionally met with.

2. *Traumatic Epilepsy in Civilian Practice.*—From this class were excluded all cases in which there was merely a history of head injury but tangible trace of such either on X ray examination or as shown by the presence of a scar. Parents and friends often recalled some head injury in an endeavour to account for the seizures. Probably only 1 in every 200 cases of epilepsy was an instance of true traumatic epilepsy. In myoclonic epilepsy of long standing the motor cortex became hyperexcitable and even in traumatic epilepsy symptoms of the "genuine" disorder (e.g., myoclonic jerks) might develop. An important question was the type of patient that developed traumatic epilepsy after a cranial injury. From a careful analysis of cases, Dr. Muskens considered that persons suffering from gastro-intestinal disturbances had a predisposition to epilepsy. The arrest of fits he believed to depend mainly on the combination of general or hygienic treatment in "genuine" epilepsy with appropriate surgical treatment in traumatic epilepsy. Exact and careful regulation of life as regards food, drink, exercise, rest, fresh air, and habit of life was necessary; and care must be taken to avoid gastro-intestinal disturbance, especially constipation. Dr. Muskens desired to protest against the custom of classifying epileptics as (1) those who reacted to luminal or bromide, and (2) those who did not. Early and incipient cases, he considered, should not be given drugs as in many cases the disorder might be checked by a definite and exact hygienic mode of life.

Epilepsy a Cerebral Disease.

Dr. Gordon Holmes (London) regretted the selection of the title "epilepsies," as he considered that the same pathological basis underlay all types of epilepsy. Epilepsy was essentially a cerebral disease and the main factor was a liability of the grey matter of the brain to discharge or react by an epileptic seizure under the influence of physiological or pathological factors. The view that epilepsy was merely a

"metabolic dyscrasia" was, he considered, an hypothesis unsupported by any scientific demonstration. The absence of anatomical changes causally related to epilepsy was one of the main difficulties in understanding its nature, but the work of Foerster, Penfield, Fay, and others on the nature of local lesions that produced epileptic seizures promised to throw light on its pathology. On the other hand, it must not be forgotten that an organ might be normal in structure and abnormal in function. The most promising approach was through the systematic study of Jacksonian or local epilepsy. The positive and negative phenomena observed in local epilepsy might be seen in both the major and minor forms of the so-called idiopathic disease. Was the occurrence of the actual attack related to any definite cause? Probably the most important of these were the metabolic changes referred to by Dr. Wilson, but as far as he (Dr. Holmes) could see, the only trustworthy results were those of Lennox and Cobb—that alkalosis, anoxæmia, and excessive hydration predisposed to attacks, but they played probably only a subsidiary part by influencing the nutrition and functional activity of nervous elements predisposed to epileptic discharge.

Experimental Investigations with Thujone.

Dr. W. RUSSELL BRAIN (London) described certain experimental investigations with thujone—the convulsant constituent of absinthe—that he had carried out it conjunction with Dr. Riddoch. The thujone convulsion in the normal cat was a stereotyped reaction, with loss of consciousness, tonic and clonic elements, and involuntary micturition broods resembling an epileptic attack in man. In cats with a localised unilateral cortical lesion produced by cauterisation, the most striking feature of the thujone convulsion was a loss or reduction of the clonic element upon that side of the body opposite to the cortical lesion. The convulsions seen in the animal deprived of both cerebral hemispheres (the thalamus preparation) differed strikingly from those of the intact animal. Instead of clonic and tonic elements, there was seen a predominance of locomotor activity—running, crawling, and leaping associated with vigorous righting reactions. In the "decerebrate animal" (the upper portion of the mid-brain being removed as well as the cerebral hemispheres) the fits were predominantly tonic or postural in character, the commonest being an intensification of the prevailing extensor hypertonia. When the entire nervous system except the spinal cord was removed, the fits consisted of a riot of spinal activities—stepping, scratching, and excretory postures and movements following each other in rapid succession. When the spinal cord itself was transected in the dorsal reflex, the only response in the hind legs was increased reflex activity.

Dr. Brain regarded the majority of epileptics as possessing a constitutional predisposition to convulsions and many also exhibited a cerebral lesion which acted as a trigger to the charge. At one extreme there were doubtless cerebral lesions gross enough to cause convulsions in normal persons, and at the other a constitutional predisposition so marked that no trigger was required. Certain facts were accumulating regarding the hypothetical predisposition. Dr. Brain thought that the following facts were established: (1) The average blood cholesterol was lower in epileptics than in normal persons. (2) It was exceptionally low during status epilepticus and serial epilepsy. (3) It tended to be unstable in the neighbourhood of a fit. (4) In a number of cases it had been observed to precede a fit. There was also considerable evidence of some form of liver deficiency in epilepsy.

Three Classes of Epileptics.

Dr. DONALD CORE (Manchester) distinguished three classes of epileptic patients: (1) Persons otherwise normal who were liable to have isolated fits that symptomatically were epileptic. Such patient might never have more than one or two such attacks even in the entire absence of treatment. (2) Emotionally uncontrolled, nervous, worrying, introspective young men, patients who were continually on the verge of hyperthyroidism with its associated vasomotor instability. In these individuals the attacks were liable to occur in more or less well-defined settings—after trivial illness, slight accidents, periods of psychical stress, &c. They worried over their attacks and often enough in the free intervals they were more troubled by their non-epileptic psychical symptoms. (3) Those who showed no impairment of emotional control but rather tended towards mental dullness which varied from slight stupidity to a definite dementia. These patients were not worried by their condition unless the attacks were unusually frequent and there may be a family history of epilepsy. From the standpoint of treatment these three groups were poles apart, and what might be a proper line to follow in one might be disastrous in the others.

The first group required no treatment at all and the less they were brought into a medical atmosphere the better. Those of the second group required emphatic reassurance that the occasional occurrence of an epileptic attack had in their case no serious significance. As far as possible they should have their thoughts directed to the morbid effect of worry in their lives rather than the effect of the attacks. They should be encouraged to live their customary lives and to avoid any restriction of their pleasures and enjoyments. Such sedative treatment as might be prescribed need not be continued for any length of time. To a certain extent the same principles of treatment applied to the third group of cases but in these drug treatment was of greater though not of the greatest importance. The most important element of treatment was to prevent the patient from looking upon himself as an outcast. If the mental dullness was such as to prevent even the semblance of a useful life in home surroundings, then he should be sent into an epileptic colony where it was normal to be epileptic and where he had a certain definite routine of life.

The Emotional Factor.

Dr. E. L. FOX (Plymouth) mentioned the importance of recognising the psychogenic origin of idiopathic epilepsy; he considered that in studying the history of cases of epilepsy the close analogy of the emotional characteristics of the epileptic with those of the hysteric was almost invariably forthcoming. He instanced cases in which repression was apparently an important factor in the causation of epilepsy and in which the attacks ceased on the repressed incident being recalled. Dr. Fox advocated the endeavour to raise the level of the emotional standards in all epileptics so that they could more readily resist the attacks.

Sphenoidal Sinusitis and Epilepsy.

Dr. F. A. PICKWORTH (Birmingham) demonstrated slides of a series of four cases of epilepsy of differing duration, all of which showed evidences of sphenoidal sinusitis and infection of the pituitary gland. He drew attention to the large proportion of epileptics in mental hospitals, and brought forward evidence indicating that epilepsy, as well as insanity, might be due (1) to an extension of sepsis from an infected sphenoidal sinus along the course of the carotid artery producing the minute focal areas of brain necrosis found in epileptics, and (2) extension through the pituitary gland to the area of the brain immediately above it which subserves vital metabolic processes especially affected in epilepsy. He emphasised the necessity of a careful examination, hitherto much neglected, of the sphenoidal sinus and pituitary gland in necropsies of epileptics.

Diet in Epilepsy.

Dr. TYLOR FOX (Lingfield) briefly outlined his experience of the ketogenic diet in five cases of epilepsy. He had found this, as had American observers, to be most effective in cases of petit mal.

He expressed the hope that others who were experimenting with the diet would publish their results.

Dr. A. MACDOUGALL (Manchester) spoke of his experiences at the David Lewis Epileptic Colony as regards the general character and temperament of epileptics.

The PRESIDENT referred to the well-known influence of intercurrent maladies on epilepsy, especially the amelioration, suspension, and even cessation of seizures following measles and other diseases. If the cardinal factor in the pathology of epilepsy was an instability of the cerebral neurones, then the cessation of fits indicated that the neural mechanisms had become more stable. It seemed probable that such restoration was the result of biochemical changes rather than of vascular or other extraneural factors. Following this line of thought—viz., that there was present a perverted metabolism—the question of diet needed further investigation. Various diets had been tried and the beneficial effect of fasting in some cases had led to the adoption of a ketogenic diet. Dr. Bury had been much impressed by the results of the lævulose-tolerance test in epilepsy—indicating some definite liver deficiency, and also by the investigations on blood cholesterol. Reflecting on the pathological changes in the liver in pernicious anæmia and the wonderful results of liver treatment in that disease, the President ventured to suggest that it would be worth while supplementing the diet of epileptic patients with minced liver.

SECTION OF VENEREAL DISEASE.

LESIONS OF LATENT SYPHILIS.

Colonel W. COATES, President of the Section, opened the session with an address on the history of venereal disease, and the ideals which were to be aimed at in modern treatment. The section was then addressed by Prof. A. S. WARTHIN (Michigan). He said he had made a study dating from 1906 of the histological lesions of latent syphilis in relation to the presence in these lesions of the *Spirochæta pallida*. He first used the Levaditi method of staining, but later, with the aid of Dr. Starry, he perfected the Warthin-Starry method which reduced the time of staining and resulted in a greater percentage of positive spirochæte findings. His material was derived from necropsies conducted on patients drawn from the whole State of Michigan, who were chiefly of the lower middle classes in the small towns and rural districts. The percentage of syphilis in this material he found to be very high, varying in different years from 30 to 60 per cent.

According to Prof. Warthin's observations, in the *leptomeninges* the lesions of latent syphilis occur very frequently, though varying in intensity, and are usually found over the sulci of the parietal and frontal lobes. The more active lesions show localised areas of a mild proliferative process with slight infiltration of monocytes, plasma, and lymphoid cells, the milder lesions being of a more sharply localised character. Every stage of severity is found from the slight fibrosis of the meninges to the typical form of syphilitic meningitis. In the brain localised perivascular infiltrations occur, mostly in the frontal and parietal lobes; they are usually few in number and vary in intensity. Otherwise it may be said that the latent syphilitic has lesions identical with those of the paretic. In both the meninges and the brain the incidence of these lesions is greater in the male than in the female.

In Prof. Warthin's experience the *heart* of every male latent syphilitic shows latent lesions varying from small areas of infiltration to the more diffuse areas of interstitial myocarditis. Though the incidence of these cardiac lesions of latent syphilis in women is small, in some women the more severe forms of syphilitic myocarditis do occur. The part of the heart usually involved in latent syphilis is the septum and the anterior and posterior walls of the left ventricle, near the apex. The lesions are intramuscular rather than perivascular and of a diffuse character. A characteristic feature is the increase of nuclei beneath the endocardium, the cells lying in two to five rows closely crowded together. Œdema of the stroma is found, being the more marked with the more active lesions. Fibrosis of the stroma results, with fatty degeneration and atrophy of the muscle fibres, though between the patches of infiltration hypertrophic muscle fibres are often seen. The aortic valve alone is commonly involved, and this through the vasa vasorum. Macroscopically, the heart of the latent syphilitic usually shows dilatation of the left or both ventricles; there is usually no valvular lesion, except in younger subjects in whom latent syphilis appears to predispose to bacterial endocarditis. In life these cases of latent cardiac syphilis show signs of myocardial insufficiency, and the common clinical diagnosis is that of "rheumatic heart." The condition is progressive and cardiac death is frequent in the male.

Latent active lesions are to be found in the *aorta* of all male, and in the majority of female, syphilitics. The lesion is essentially a disease of the vasa vasorum, which become thickened and obliterated; the term "mesaortitis" is a misnomer. This results in a slow infarction of the intima and part of the media, with sclerosis and atrophy of the muscle and degeneration of the elastic tissue. The syphilitic character of these lesions can only be determined by microscopical examination. Syphilis of the aorta exists in three forms: with aneurysm, with aortic insufficiency, and with lesions of the vasa vasorum alone. The latter is the most common; it may be symptomless, or give the syndromes of aortalgia, or even angina pectoris. Aneurysms are generally produced by local weakening of the walls due to miliary gummata along the vasa vasorum. Spirochætes in small groups can be demonstrated by the improved starch-gelatin modification of the Warthin-Starry method.

In both sexes the *liver* is usually the seat of latent syphilitic lesions. They consist of infiltrations of the periportal tissue, leading to fibrosis and some hepatitis. All stages of severity exist up to the severest form of cirrhosis (hepar lobatum), which latter condition is more frequent in women than in men. The percentage of liver involvement appears to be on the increase, particularly in the cases which have received modern arsenical treatment. Spirochætes are more difficult to demonstrate in the liver than in any other organ, usually being found only in small numbers and in the active areas of infiltration.

Lesions of latent syphilis are common in the *pancreas* though usually mild; they take the form of an interstitial pancreatitis not arising from the ducts. The intralobular stroma is increased and the islands may become fibroid. He has found this condition the most common cause of diabetes in his diabetic cases.

In the *adrenals* latent syphilitic lesions are more severe in women than in men. In the majority of cases they do not produce signs of adrenal insufficiency, yet they may be severe enough to cause marked atrophy and fibrosis, giving a typical clinical picture of Addison's disease. The spirochætes are easily shown in the cellular infiltrations, but in small numbers.

The *testis* of every latent syphilitic shows sooner or later patches of interstitial orchitis, with atrophy of the germinal epithelium and fibrosis of the basement membrane of the tubules. An early loss of spermatogenetic function occurs in the majority of cases.

Prof. Warthin has never found a syphilitic lesion in either the *ovaries* or the *Fallopian tubes*. The spirochæte has been demonstrated in the ovary in congenital, but never in acquired, syphilis. This suggests a local tissue immunity of the organ. Lesions have been found in the endometrium of the *uterus*, extending into the uterine wall.

It is true, he said, that the latent syphilitic presents a high percentage of *pulmonary fibrosis*. Only rarely, however, can the spirochæte be demonstrated or gummata shown to be present. He had only encountered 15 cases in which the presence of pulmonary syphilis was positively proved, the majority of these

cases being associated with gummatous lesions, the remainder being cases of Ayerza's disease.

In conclusion, Prof. Warthin pointed out that the lesion of latent syphilis repeats the essential pathology of the hard chancre and of the secondary and tertiary lesions of active syphilis, being predominantly vascular and perivascular, and the infiltrations being derived from the proliferation of cells in situ. He had never seen at necropsy a case of perfectly healed syphilis, a statement which was as true of cases treated in the modern manner as of cases treated by the old mercurial method; the more evident difference was the greater frequency of chronic hepatitis in cases treated by the arsenical method. What the treatment did accomplish in either case was the more rapid reduction of the average active case to a state of latency. The latency of the infection might last throughout the individual's life or at any time exacerbations might take place, and the disease rise above the clinical horizon; what determines these exacerbations was yet to be learnt. Whether a five years' period of treatment would finally rid the body of spirochætes he could not say, for no more than three years' treatment had been given to the cases from which he derived his material.

Discussion.

The discussion was opened by Sir HUMPHRY ROLLESTON, who commented on the magnificent slides which Dr. Warthin had exhibited. He asked whether the spirochætes in the slides had been proved to be the *S. pallida*. The incidence of latent syphilis would appear to be very high. Could a patient never be deemed free from syphilis until the pathologist's verdict at necropsy had been obtained? If both early and late treatment were given, could not these cases be prevented from becoming latent? What was the relation of the Wassermann reaction to latent syphilis?

Colonel L. W. HARRISON appealed for a more optimistic view than that presented by Prof. Warthin. He wondered if Dr. Warthin's cases were drawn from a highly syphilised population where old methods of treatment had been in vogue. He could not agree that the arsenical preparations were merely immunising agents; he considered them to be definitely spirochæticidal, as instanced by the rapid disappearance of certain specific lesions after even one dose of intravenous arsenic. He further understood that tissue transplantation from infected animals after they had received early arsenical treatment did not transmit the disease. He was strongly of the opinion that arsenobenzol was useful in the treatment of cardiovascular lesions, when it was skilfully exhibited.

Prof. G. LORRAIN SMITH asked whether Dr. Warthin had examined the skeletal muscles of his cases. Did the *S. pallida* act on the organism by means of a toxin or by the effects of local tissue reaction—for example, the perivascular changes?

Dr. DAVID NABARRO said that in 14 years at Great Ormond-street he had decided that the diagnosis of congenital syphilis was by no means simple. The signs were often latent, and diagnosis was particularly difficult after the first few weeks of life. He gave a comprehensive review of the clinical manifestations of congenital syphilis and showed X ray pictures revealing abnormalities in the skeleton which were not otherwise apparent.

Dr. DAVID LEES asked whether Prof. Warthin had examined any cases which had been treated with malaria. He agreed with Colonel Harrison that cardiac conditions benefited from careful treatment with arsenobenzol. Could Dr. Warthin explain the absence of the *S. pallida* in the ovaries and the tubes? He had observed that a positive W.R. generally became negative with the onset of the menopause. He further asked whether the *S. pallida* were alive or moribund in the sections which had been shown.

Dr. E. TYTLER BURKE thought that the results obtained by Dr. Warthin might be due to incomplete treatment. He was not satisfied that there had been early and persistent treatment. He thought that the amount of syphilis in this country was greatly underestimated; he put in a plea for the more adequate teaching of venereology in the medical schools and among post-graduates.

Dr. H. M. HANSCHELL stated that he had been staining slides by the Levaditi method and had found them unsatisfactory. In his experience syphilitics did not complain of early loss of sexual desire. He suggested that the word "fenced" be used instead of latent or dormant, indicating that the *S. pallida* in these cases was fenced by fibrosis from the drug. He recommended excision of the primary lesion (and even in some cases of accessible indurated lymphatic glands) where the condition did not clear up readily under the influence of arsenobenzol. He could not too strongly emphasise the importance of early and thorough treatment.

The PRESIDENT, in calling upon Prof. Warthin to reply, said that he had been reluctant to admit that cases of second primary infections could occur, though he had had cases which strongly suggested this phenomenon. Many years ago he had practised excision of the primary chancre, but he had come to the conclusion that this had no influence on the course of the disease.

Reply.

Prof. WARTHIN, in reply, stated that the spirochætes in question had been inoculated into rabbits with the production of typical syphilitic lesions. He reiterated that in all of his cases he had never seen a complete cure; there were latent lesions in all of them. Latent syphilis was really a high grade immunity. He concurred with the contention that arsenobenzol was spirochæticidal, but he would emphasise that its practical effect, along with other antisyphilitic remedies, was the production of immunity. He considered that a strongly positive W.R. indicated active syphilis, with certain exceptions, such as widespread malignant disease, chicken-pox, and miliary T.B. He considered that a negative W.R. was of no value whatever. He could not agree with Col. Harrison that he was a pessimist. He admitted that his cases were drawn from a highly syphilised community, but many of his cases had been treated for three years according to modern methods. He considered that it would only be useful to treat early cardiovascular conditions with arsenobenzol, since old lesions could not be cured. He had not examined the skeletal muscles of his cases. He believed that the *S. pallida* acted by local tissue reaction rather than by a toxin. He could not explain the local tissue immunity of the ovaries and tubes, though many theories had been put forward. To Dr. Lees he replied that a moribund spirochæte was always fragmentary. He did not think that extirpation of the primary chancre could make any difference to the progress of the disease. With reference to second primary infections, it was to be remembered that animals becoming immune to one strain of *S. pallida* could be infected with another strain. It was highly probable that the same results obtained in human beings.

A number of microscopical slides prepared by Prof. Warthin were open for inspection in the Pathological Museum.

SECTION OF ANÆSTHETICS.

Dr. A. L. FLEMMING (Bristol) presiding, Dr. H. P. FAIRLIE (Glasgow) read a paper on

Ethylene and Oxygen Anæsthesia.

He said that the proportion of ethylene gas to oxygen was usually about 88 per cent. ethylene to 12 per cent. oxygen, but varied according to the age and build of the patient, the condition of heart and lungs, and the nature of the operation, the oxygen percentage always being maintained at such a level as would prevent respiratory failure; more than a slight degree of cyanosis was regarded as a danger sign. If this point was remembered the anæsthetic was perfectly safe. Dr. Fairlie himself arranged for re-breathing, using the same apparatus for ethylene

administration as for nitrous oxide and oxygen. As far as safety, rapid action, and immunity from ill effects were concerned ethylene and oxygen anæsthesia resembled nitrous oxide and oxygen. There were, however, two points of difference, the first being favourable to ethylene in that a deeper anæsthesia was obtained. In Dr. Fairlie's experience some cases did better with ethylene and oxygen anæsthesia than with a nitrous oxide anæsthesia. The second difference was the very disagreeable smell of ethylene gas, which affected the other occupants of the operating theatre more than the patient. He was in the habit of having his gas made up with oil of eucalyptus and had never had any complaints from the patient.

Dr. Fairlie reviewed the advantages of ethylene from the points of view of the patient, the surgeon, and the anæsthetist. The patient did not experience disagreeable sensations; he lost consciousness rapidly without showing resentment or excitement, and though vomiting occurred in about 75 per cent. of cases it was within a minute or two of the end of the administration. No unpleasant taste remained. The surgeon was satisfied with the anæsthetic in all cases except those in which much relaxation was required. The anæsthetist was provided with a safe anæsthetic with a large margin of safety, and had ample warning of any impending danger. Dr. Fairlie alluded to the inflammability of ethylene gas and the precautions necessary in using it.

The PRESIDENT asked for information on the margin of safety.

Dr. K. B. PINSON (Manchester) in his dental work had found ethylene successful in some patients where nitrous oxide had failed, and had been disappointed in the results in other patients. He advocated the use of ethylene in old and feeble patients and in those who were very ill. He suggested that its safety was due to the amount of oxygen employed, and did not consider the smell a contra-indication.

Dr. C. F. HADFIELD (London) referred to the work of Prof. H. B. Dixon and the intense importance to the anæsthetist of the flash point and ignition point of gases. The smell of ethylene gas was not due to impurities.

Dr. H. E. G. BOYLE (London) read a paper on

Gas and Oxygen in Midwifery.

He said that he had always regarded chloroform as a dangerous and toxic drug to give a woman at childbirth, and stressed the advantages of nitrous oxide and oxygen anæsthesia, which had been made familiar to him by Dr. Wesley Bourne of Montreal. He said that the patient was given nitrous oxide and oxygen with every pain and learned to ask for the mask, since the anæsthetic diminished the pain. Owing to the fact that the gas was non-toxic it could be given for a long time without harm to mother and child provided there was no cyanosis. The anæsthetist could greatly reduce the work of the obstetrician, since he need not send for him until about one hour before the child was born. Another advantage was that the patient could be completely anæsthetised if ether was added when the head was on the perineum; when the head was born the gas and ether were shut off and carbon dioxide and oxygen (1 in 6) given, with the result that the mother's respiration was increased and the child became a rosy pink and "gave tongue." The anæsthesia could be deepened again for the delivery of the placenta. Patients in his experience recovered consciousness very quickly. He cited as disadvantages the fact that a special anæsthetist who was familiar with the method had to be present, and that special apparatus had to be used; for these reasons also the cost was greater. His impression was that the pains were not slowed but were rather increased in frequency and in strength where plenty of oxygen was used, and patients were certainly less exhausted and recovered more quickly than when choloroform was used. He emphasised the importance of avoiding cyanosis.

In the discussion that followed Dr. R. C. MOTT (Burslem) said that he saw no objection to giving gas and oxygen throughout the labour. Dr. E. F. HILL (Manchester) objected to the method on the score of expense and suggested that labour pains should be mitigated by means of chloroform given with a Vernon-Harcourt inhaler.

Dr. F. P. DE CAUX (London) then read a contribution on

Glucose—Why, When, and How to use it.

as an antidote to the shock of operation and anæsthesia. He described the mechanism of its working according to Mr. J. McDonagh's theories. He advised the use of 15 to 20 units of insulin two hours after the injection of glucose.

He recommended that glucose should be given before a severe operation, when liver efficiency was suspected, when the basal metabolic rate was high, as in Graves's disease, and when the patient was emaciated or under-nourished. Glucose should always be given after operation when a blood transfusion was impossible and after any anæsthetic where the patient showed signs of shock; where glucose had not been given before; where the surgical manipulation had been rough; when more anæsthetic had been used than usual; and when there was a history of epilepsy.

A discussion followed in which Dr. FAIRLIE, Dr. HILL, and Dr. MOTT took part.

Dr. WINIFRED WOOD (Edinburgh) read a paper on

Rectal Ether Oil Anaesthesia, with Special Reference to Brain Surgery.

She had used in over 70 cases a modification of the technique devised by Dr. J. T. Gwathmey of New York, who had closely investigated the properties and the action of ether in oil. The safety of this type of anæsthesia was the reason for its employment in cases of bad surgical risk and she cited certain operations in which it had been chosen. She pointed out its application to severe and prolonged operations in brain surgery. The method had three advantages in brain surgery: (1) access to the patient's face was not necessary; (2) the dose of ether was smaller than in an inhalation anæsthesia; (3) by reason of the sleep-like quality of the anæsthesia the administrator was free to take observations on blood pressure, pulse, and respiration, which formed a valuable guide to the condition of the patient and to how far operation might proceed. She gave a brief account of the technique employed, pointing out that the procedure in general surgery and brain surgery was different owing to the fact that morphia was strongly contra-indicated in the latter. The anæsthesia produced by rectal ether was very light and might have to be supplemented by inhalation ether vapour in certain cases.

Dr. Wood discussed the action of rectal ether from the physiological aspect, referring to its slight effect on blood pressure even after many hours administration, and the relative absence of disturbance of the acid-base balance. Difficulties might arise from the pre-existing intracranial tension and the hæmorrhage during operation. With this type of anæsthesia there was generally a good convalescence with none of the complications usually ascribed to the anæsthetic. The long period of sleep after operation was an asset. Notes of brain operations on middle-aged and elderly patients which lasted from three and a half to six and a half hours were given to show the satisfactory condition of the patient during and after operation, even when hæmorrhage was so severe as to necessitate blood transfusion on the table.

Dr. S. THOMSON ROWLING (Leeds) read a paper on the

Scientific Administration of Anæsthetics

and demonstrated his modification of Clover's inhaler, along with the anæsthetic table which is designed to supply oxygen, nitrous oxide, and carbon dioxide in any percentage combination with or without chloroform vapour of definite strength. Describing the nervous, circulatory, and respiratory depressions that arise from anoxæmia, and in which apnœa plays a part, he stressed the importance of the use of oxygen

and carbon dioxide together during an anæsthetic. He believed that all dangers of anæsthesia, operative and post-operative, could be prevented by the administration of an anæsthetic with this apparatus, which provided for a percentage of ether, oxygen, and carbon dioxide according to the patients' requirements. Dr. Rowling quoted cases to show the good results obtained.

Reviews and Notices of Books.

Recent Advances in Pulmonary Tuberculosis.

By L. S. T. Burrell, M.A., M.D. Cantab., F.R.C.P. Lond., Senior Physician to the Royal Free Hospital; Physician to Brompton Hospital for Consumption and Diseases of the Chest. London: J. and A. Churchill. 1929. Pp. 217. 12*s*. 6*d*.

In the preface of his book Dr. Burrell states that he has "tried to describe the recent increase in our knowledge of tuberculosis, and to separate the real advances in treatment from those methods which have no scientific basis, and enjoy but brief, though occasionally recurrent, phases of popularity." In this attempt he has been most successful, and his book will be read with profit not alone by those who are specially interested in diseases of the chest. It is illuminated throughout by a common sense not always exhibited by those who write on tuberculosis, and this is a virtue which will be appreciated by the general practitioner. In discussing scientific theories, Dr. Burrell knows how to compress his matter without losing the interest of his reader, and his explanations are always lucid. A chapter on radiology is illustrated by a series of skiagrams provided by Dr. Stanley Melville. These are well produced and should demonstrate the supreme value of this means of diagnosis to those whose opportunities for studying radiograms are limited. Seven of the 12 chapters are devoted to the treatment of pulmonary tuberculosis and its complications. Adequate nourishment, rest, and fresh air remain the most generally effective methods for combating the disease, and Dr. Burrell's grasp of essentials is well illustrated in his references to these. Modern methods of treatment are designed to supplement and not to supersede treatment on sanatorium lines. The uses and limitations of sanocrysin are well summarised in a short chapter which is followed by one fully describing artificial pneumothorax. In the next edition of the book the sections on operative treatment by thoracoplasty and other surgical methods might be expanded, since recent advances in thoracic surgery are noteworthy.

Handbook of Physiology.

Eighteenth edition. By W. D. Halliburton, M.D., LL.D., F.R.C.P., F.R.S., and R. J. S. McDowall, M.B., D.Sc., F.R.C.P. Ed. London: John Murray. Pp. 902. 18*s*.

Though the young medical student may be content to borrow from a library a large tome on anatomy and supplement it by short dissecting manuals, he usually buys his first text-book of physiology. It is therefore this work which he opens eagerly in the first evenings of October, feeling that by getting ahead of his lectures he can prepare himself to enjoy them and to take notice rather than notes of the spoken instruction. It must be confessed that his first reaction is generally one of disappointment. In the elementary form in which they are presented to the medical student, chemistry, physics, and biology seem fairly concrete and established sciences. Of the gross and minute structure of the body, too, more is apparently known with precision than he can ever hope to acquire in two years' of study. In physiology, however, when he seeks information on subjects which may interest him—for example, the meaning of sleep, the exact functions of the liver which are deranged in a "bilious attack," the mechanism of secretion of urine—he finds that these phenomena are still largely in the realm of theory. He begins to wonder how he is going to grapple with the subject, for there is nothing more difficult to remember, and especially to reproduce, than an argument involving the examination of many theories mutually contradictory and each founded on experiments which in themselves seem reasonably conclusive. It is no wonder that the student turns to the dissecting room for relief, though the relief may change to despair when he persistently fails to discover those cutaneous nerves which in the pictures protrude so convincingly through the superficial fascia. He has to learn that his days of simple acceptance of facts imparted by a teacher are over and his duty henceforward will be critically to examine and then to assimilate such knowledge as has been gained painfully by observation and experiment. It is largely through the medium of his first text-book that his attitude to physiology and ultimately to medicine will be formed, and to strike the mean between too much simplification, which will only postpone the difficulties, and too much complexity, has been the task successfully accomplished during many years of active teaching by Prof. Halliburton. It is thus a pleasure to see that this Handbook of Physiology has been reissued after four years in a renewed form. In the preparation of this eighteenth edition Prof. Halliburton has had the collaboration of Prof. McDowall who succeeded him in the chair of physiology at King's College, London. Prof. McDowall has contributed several new chapters and has rewritten others. That on the nervous system has been brought up to date and an account of postural and conditioned reflexes has been included. Sections on the autonomic nervous system, speech, the control of the circulation, carriage of carbon dioxide, maintenance of body neutrality, the vitamins, ductless glands, and intermediate metabolism are also for the most part new, while recent work on the formation of blood and the bile, on the spleen, on the control of respiration, and on test-meals, has been added. To admit all this new material anatomical detail has been reduced, but essential anatomy and histology are retained. There are now more good text-books of physiology than there were 30 years ago when Prof. Halliburton first took charge of a work which had maintained its vitality for half a century, since it originally appeared in 1848 as Kirkes's Physiology. We seen no reason why this edition should not be as popular as its many predecessors, and we trust that Prof. Halliburton's name may for long be associated with its further progress.

American Chemical Society Monographs.

Thyroxine. By Edward C. Kendall, M.S., Ph.D., D.Sc. The Mayo Foundation, Rochester, Minnesota. New York: The Chemical Catalog Company, Inc. 1929. Pp. 265. $5.50.

Biochemistry of the Amino-Acids. By H. H. Mitchell, Professor of Animal Nutrition, College of Agriculture, University of Illinois; and T. S. Hamilton, Associate in Animal Nutrition of the College. Same publishers. 1929. Pp. 619. $9.50.

The appearance of Kendall's book, which was announced some years ago, has been delayed in order that the author might first bring to a conclusion his work on the constitution of thyroxin. It is mainly concerned with the chemical nature of the thyroid gland and its secretion, and forms one of the monographs issued by the American Chemical Society. In the last few months of 1914 Dr. Kendall's persistence in pursuing a long and tedious series of researches was rewarded by the isolation of a substance which he named thyroxin. Since the physiological activities of the whole gland are centred in this crystalline substance its isolation has extended our knowledge not

only of the internal secretions, but also of the nature and regulation of life-processes in general. Dr. Kendall says in the preface: thyroxin bridges the gap between living protoplasm and the expression of what may be called personality or temperament, and has a definite place in the study of normal and abnormal mental processes.

Since the discovery by E. Baumann in 1895 of the remarkable fact that iodine was a normal constituent of the thyroid gland, attempts have been made to find a reason for the presence of this element and to determining the chemical nature of the particular compound in which it is involved. Baumann showed that acid hydrolysis gave a substance which he called thyreo-iodin or iodothyrin, which contained a very large proportion, about 10 per cent., of iodine, and which had the same action as desiccated thyroid when given to patients suffering from either hypothyroidism or from goitre. A few years later, in 1907, Nürnberg showed that the two amino-acids, tyrosine and tryptophane, were essential constituents of iodothyrin. Nürnberg used the process of digestion with barium hydroxide in the preparation of his material, and therefore in two important points he anticipated the results which Kendall and C. R. Harington were later able to achieve. Unfortunately, Nürnberg discarded the insoluble fraction resulting from the digestion, and it was this fraction, as Kendall showed later, that contained the thyroxin. The advances made in the next few years were slight, and it was not until 1914 that Kendall's researches led to the isolation of the crystalline substance from sheeps' thyroid. The author's early experiments make fascinating reading. After three years' steady work seven grammes of the compound had been accumulated from a vast quantity of the gland substance. The crystalline structure and the physical and chemical properties were described, and several derivatives were prepared. Acting on the belief that the compound was a derivative of indole, possibly from an iodised tryptophane precursor, Kendall and Osterberg suggested a probable formula which the work of Harington during the last four years has shown to be incorrect. Great credit must be given to Kendall for the modest manner in which he refers to this work. Harington, in a series of monumental researches, has shown beyond doubt that the constitution of thyroxin is really that of an iodised derivative of tyrosine and not of indole or tryptophane. The difficulty of the problem was bound up with the presence of the iodine in the organic molecule; Harington described in 1906 how he first reduced thyroxin, thus preparing the iodine-free parent substance which was eminently suitable for chemical work. In this way it was first definitely established that the iodine free compound, and hence probably thyroxin itself, was a derivative of tyrosine. Harington then synthesised the iodine-free compound, and a year later, working with G. Barger, published the synthesis of the tetra-iodo compound and proved that this substance was chemically identical with thyroxin, and also increased the basal metabolic rate to the same extent. By a remarkable coincidence Dakin had also discovered that thyroxin may be made to yield tyrosine, but on hearing of Harington's much more complete results he withdrew his manuscript from the press.

These recent advances are of such interest that they have properly occupied a great deal of the space available of this book, though they constitute only a portion of its contents. The remainder deals adequately with the influence of the thyroid gland on hypothyroidism, on the metabolism of carbohydrate nitrogen, phosphorus and calcium and on the distribution of water, on the nervous system on growth, and on the basal metabolic rate. Other sections describe the standardisation of the hormone and its influence on amphibian metamorphosis. The concluding chapters of the book describe the relation between the histological appearance and the activity of the gland, some clinical aspects of thyroid disease, and finally the effect of thyroxin on some biological oxidations. The bibliography contains 541 references.

Prof. Mitchell's work is one of the same series of monographs. The biochemistry of the amino-acids is complicated, and the authors have set themselves a difficult task. In the first place, it is not easy to draw a line between the pure chemistry and the biochemistry of the amino-acids, and wherever an author attempts to draw this line he is liable to criticism. For instance, although in the first chapter the chemical properties of the amino-acids are described in fair detail, there is practically no indication of the synthetic work that has been done in building them up into peptides. The sketchy account of this important achievement is unsatisfactory, though admittedly an adequate presentment would have taken up much space. The next chapter, dealing with the determination of amino-acids in proteins, gives a full and critical description of all the best known methods employed, with an exhaustive review of the literature of the subject. This is followed by an equally detailed section on the individual amino-acids; a series of tables give the amino-acid content of different proteins as determined by various methods, a reference being given to each figure quoted. The fourth chapter, on the liberation of the amino-acids in the intestinal tract, is followed by three chapters devoted to amino-acid metabolism. Their specific dynamic effect is next considered, and the final chapter of the book deals with the value of proteins from the point of view of nutrition.

A fine piece of work and a valuable contribution to biochemical literature.

BOOKS FOR NURSES.

Gynæcology for Nurses. Fifth edition. By COMYNS BERKELEY, M.A., M.D., M.C. Cantab., F.R.C.P. Lond., F.R.C.S. Eng., Gynæcological and Obstetric Surgeon to the Middlesex Hospital, &c. London: Faber and Faber, Ltd. 1929. Pp. 426. 7*s.* 6*d.*

FOR nearly twenty years this has been one of the most popular text-books for nurses in the English language. The fifth edition has been extensively revised, and in parts rewritten; the author notes that revision has been greatly aided by suggestions sent by sister tutors throughout the country. New matter has been added with reference to X rays, radium, blood transfusion, and the modern methods of treating syphilis. The book owes its popularity to its simplicity, its clearness, and its dogmatic teaching. The author never forgets that he is writing for nurses and not for medical students.

The Nurses' Handbook of Hygiene. Second edition. By L. E. H. WHITBY, M.A., M.D. Cantab., M.R.C.P. Lond., D.P.H., Assistant Pathologist, Middlesex Hospital. Same Publishers. 1929. Pp. 163. 4*s.* 6*d.*

THE second edition of this handbook, while it occupies approximately its former bulk, has been brought up to date in most of its sections, particularly in relation to vitamins and food preservatives. It suffers from the defects common to books which attempt to cover a very wide range of subjects in an elementary fashion. For instance, ventilation is discussed at considerable length without reference to the katathermometer, although the estimation of carbon dioxide is given as a measure of ventilation; standards for metallic impurity of water are mentioned, but the importance of chlorine and ammonia is only noted in general terms. The designation "Grade A. Certified," in relation to milk, does not exist. The connexion of summer diarrhœa, diphtheria, and typhoid fever with contamination of the atmosphere of houses by sewer air would not now be generally accepted. The author's views on the milk problem are of interest; his suggestion that milk from tubercle free herds should always be boiled will not meet with general acceptance. These points are noted because, on the whole, the book is a useful guide, and nurses will find therein most of the information on hygiene which they will need for examination purposes.

THE LANCET.

LONDON: SATURDAY, SEPTEMBER 14, 1929.

A NATIONAL MATERNITY SERVICE SCHEME.

In reviewing the vital statistics for 1928 last week we had to record that the maternal death-rate for that year (4·42 per 1000 live births) offered little scope for optimism, being the worst on record since 1911. A more hopeful outlook for the future is to be anticipated since the adoption by the British Medical Association of a scheme for a National Maternity Service which is based on sound lines and may lead to important legislation. It is proposed to utilise the services of general practitioners and midwives with as little additional machinery and institutional accommodation as possible, and it could therefore be brought into action in a reasonable period of time with the minimum dislocation of existing conditions of practice. The principles on which this scheme, which was outlined in THE LANCET of July 27th (p. 195), is based are that normal maternity cases can be safely treated at home, and that mortality and morbidity can be greatly reduced by proper care and supervision during the antenatal, natal, and postnatal periods. The cost of the scheme, calculated at £2,100,000, could be met on a compulsory national insurance basis, which would include at once all women entitled to maternity benefit; others in a similar economic position could be brought in by further administrative action, leaving only the small percentage working on their own account to come in on a voluntary basis. The additional contribution to meet the services outlined is reckoned at 0·4*d.* a week from the employer and insured person, made up to 0·6*d.* by the State. Against this could be set some saving to the State and local authorities in the shape of fees paid to doctors called in by midwives and lessened costs of clinics. A medical practitioner and midwife would be provided for all pregnant women under the insurance scheme. Antenatal care would be shared by both, the midwife keeping the patient under close supervision. The doctor would examine her at least once, determining whether her labour can be left to the midwife, and would respond to the call of the midwife throughout pregnancy, labour, and lying-in, if required. The doctor would see every patient and, if necessary, make a pelvic examination, before she returns to work. Additional material and service allowed for in the cost include payment for hospital accommodation for cases unsuited to delivery in their own homes, sterilised dressings, ambulance facilities, and another practitioner when required for consultation or administration of anæsthesia.

A system of this kind, by which attendance on the normal is left to the midwife with medical supervision and assistance in the case of abnormality, has been widely advocated as the one most likely to lead to a lower maternal death-rate. Briefly, the reasons given in support of it are that mortality is lowest in those countries where such a system prevails—e.g., Scandinavian countries, Holland, Italy; that the best results in this country are obtained under this system, as in the midwifery service of the Queen's Institute, hospital and other maternity districts; that as soon as it is recognised that the first object in midwifery is to maintain the normal throughout childbearing it is needless to use the more highly trained medical services for attendance—often prolonged—on natural labour, if a midwife with a doctor on call will suffice. The British Medical Association has now accepted this view, has brought out a scheme embodying the methods of institutional practice, and has shown how the change can be effected by improving and using in a different manner the existing machinery. That the scheme brought forward by the Council was adopted by the representative meeting with only minor emendations after a brisk discussion justifies the agitation on maternal mortality, for five years ago acceptance of the scheme now outlined would have been almost unthinkable. That there would be difficulties and disappointments in its initial stages is certain, for the results obtained in hospital districts cannot be expected at first, since institutions have a tradition behind them as well as a carefully selected and skilled personnel. Even if the patients attended by the Queen's Institute are in some degree a selected group, the results obtained by its midwives with medical aid provided by local practitioners are sufficient to show that the system of working is itself the most important factor, and one would expect that a national service of the kind envisaged by the Association's memorandum would soon approximate to the Queen's Institute figures. One question that must be left unanswered is how the insured women would behave under it. Would they demand more of the medical services than the scheme has provided for? Previous experience of women under the National Health Insurance Act suggests doubts as to the possibility of making any accurate estimate.

In a paper that appears elsewhere in this issue, Mr. GIBBERD gives figures from Guy's Hospital district which point in the same direction as those from the Queen's Institute and the institutional district practices in London, Liverpool, and Scotland, quoted in the appendix to the Association's memorandum. Though in Guy's Hospital district attendance is divided between medical students and midwives the system of working is the same. In order to make his cases an average sample of the general population and render his figures more comparable with the national, Mr. GIBBERD has included all patients domiciled in the area of the hospital, whether delivered at home or transferred to hospital. He omits, however, to draw attention to the fact that his figures are not strictly comparable to the national figures, because his are based on 1000 deliveries and the national ones on 1000 live births, and his figures exclude deaths due to early abortions and other conditions in pregnancy not falling under the ordinary work of a maternity district. These points, however, in no way invalidate his interesting comparison of the two periods under review, and he is able to show what the national returns have been unable to show, and that is a remarkable drop in the maternal death-rate. In the last ten years the rate was but a quarter of what it was sixty years ago, 1·03 in place of 4·4 per 1000 deliveries. His figures regarding the amount of interference in the two periods are of great value, though, unfortunately, those of the recent period are confined to the cases in one year only (1928) and may thus differ considerably from the average. The percentage of Cæsarean sections suggests an error that would be lessened somewhat if a greater number of years had been averaged. It works out at 1·3, the

same as the total interference in the early series. Over one abdominal delivery in an average sample of 100 obstetric cases would certainly be excessive. By careful antenatal supervision the percentage of obstetric interference in all cases in 1928 was under seven, and the forceps rate under five. Small though it was it was five-fold what obtained in the earlier period, and Mr. GIBBERD considers that this greater interference eliminated the cases of profound exhaustion in the earlier series, and with an improved technique lessened the incidence of sepsis. His comparison of the results attained in various obstetric complications is particularly instructive as showing where treatment to-day has advanced and where it has stood still. The facilities for the removal and reception of serious cases indoors must have been improved in the sixty years and also be a factor in producing better results. His paper is a valuable contribution to the maternal mortality discussion and forms a happy augury for its reduction once some such national scheme as that of the British Medical Association is put into operation. We trust that the Association will now set to work on the task of translating its scheme into legislation.

MEDICAL EDUCATION IN U.S.A.

HIGH ideals, boundless energy, and vast wealth have, in the last 20 years, completely revolutionised medical education in the United States. ABRAHAM FLEXNER'S report of 1910 crystallised the situation and was quickly followed by the extrusion of most of the incompetent and fraudulent institutions—about one-half of the whole number—and by an extraordinary increase in the equipment and efficiency of those which were left. Many of the best medical schools in the world are now in the United States. So deliberately have these changes been planned and so quickly have they been brought about that they are easily within the academic life of an individual; they can be seen from the beginning and hence form at the moment the chief object of interest for those engaged with the medical curriculum and with the methods and results of teaching. Statistical tables and graphs in the annual educational number of the *Journal of American Medical Association*, which has just reached us, illustrate the progress which is being made. It continues to be true that the number of persons who apply for admission to the medical schools is considerably in excess of the accommodation. Each good school admits a definite number of new students each year. Taking all the schools together about 60 per cent. of the applicants are accepted. In England we can, at present, only envy any school which starts with students so highly selected. The selection is continued in the subsequent years; unsatisfactory performance and laziness are rebuked once and then expelled, the loafer and the chronic are unknown. Substantial progress has also been made at the other end of the curriculum. A university degree in medicine carries with it no right to practise. For this, qualification by one of the State licensing boards is necessary. Since the Federal Government has no control over education, and since it cannot infringe any of the privileges of the State legislatures, there is no official method by which the procedures and standards of the various States can be correlated and brought into reasonable agreement with one another. But an unofficial body—"the National Board of Medical Examiners of the United States"—emanating in 1915 from Dr. W. L. RODMAN and the American Medical Association, has gone far to supply the deficiency. It holds examinations in many of the chief medical schools and grants a diploma which has so quickly established its reputation that already it is accepted by the licensing authorities of 37 States in lieu of their own examinations. It will no doubt secure the desirable end that practitioners qualified anywhere in the States can practise anywhere in the States, and not as at present only in their home State, and that the standard for qualification will be everywhere the same.

A further achievement worthy of notice is the physical realisation of an intimate coöperation between the university, the laboratory sciences, and the wards which many reformers have desired. The Rockefeller Institute has published an illustrated account of the new Vanderbilt University School of Medicine, at Nashville, Tennessee, which has been erected at a cost of something more than 1½ million pounds. In the first place, the whole school and hospital are topographically and actually part and parcel of the university; in the second place, the science departments, from anatomy and biochemistry onwards, are in the same building as the wards. The school of nursing is next door. The clinical staff includes part-time as well as whole-time teachers. It has been urged in some quarters for years past that, if the teaching of medicine is to reach a university standard, the university ought to control the wards as it does the dissecting rooms. The difficulty in doing this has been mainly financial, and the various arrangements whereby students have the run of hospitals not under university control have generally worked well enough. Recent events in Cardiff, however, have given a signal example of the dangers of the common method, and no doubt the Vanderbilt plan is preferable if someone will find the money; the cost at Nashville is about £75,000 a year for 208 beds. The housing of all departments under the same roof is certainly no less important if coöperation rather than individuality is aimed at. A common luncheon room can do a great deal to bring the laboratories and the wards together, and in the Vanderbilt school the science departments occupy the lower floors of the same blocks as carry the wards above. Theoretically, therefore, the new school seems to be a distinct advance. There is, however, at present, at any rate, one substantial criticism to make. The school admits 50 students each year and 208 beds seem quite an inadequate allowance for practical clinical teaching; there must surely be an undue proportion of theory to practice. In pathology, too, practical experience must be sadly defective. Large and important parts of pathological anatomy can be learned only in one way—on the fresh dead body. And as only about half the deaths come to autopsy, it is difficult to see how the students learn the subject which is the basis of so much of their clinical work. We should be glad to hear that the Vanderbilt school had seen the necessity and found the money to double their beds.

CREMATION AND PUBLIC SAFETY.

IT was inevitable that the series of inquests and exhumations in connexion with the late Mr. DUFF and his family should create a certain misgiving or disquietude which would find public expression. In a letter recently published in the *Times* Mr. ERNEST H. COOK, D.Sc., offers some not unreasonable comments and suggestions. He remarks in the first place that the system of disposing of the dead by

cremation is one which is commending itself to an increasing number of thoughtful people on the score of communal hygiene and public health; yet, if the victims in the recent cases where foul play is suspected had been cremated, the supposed crimes would have gone entirely undetected. The files of the Director of Public Prosecutions probably contain similar instances, and it is doubtful whether the Home Office will feel disposed to view with equanimity the possibility that poisoners and others can at present escape the consequences of their misdeeds. The existing safeguards under the Cremation Rules have been regarded as adequate; there must be a sworn application from an executor or near relation who must declare that he knows no cause why cremation should not take place. There must also be two medical certificates, one from the practitioner who attended the deceased and another from a medical referee. The question is whether there should not be also a thorough post-mortem examination and chemical analysis, though, even if these additional precautions are added, mistakes may occur. Dr. COOK considers that in Mr. DUFF'S case, if cremation had been applied for, it would almost certainly have been granted. This, however, is by no means sure; there were puzzling symptoms about Mr. DUFF'S death to which his medical attendant drew attention and which removed the case from the absolutely normal; it should be possible so to frame and carry out the regulations that cremation can never be sanctioned in any case of doubt.

A second point is made by Dr. COOK with regard to judicial autopsies. No analyst, he says, can safely claim never to have made a mistake. Moreover, the analyst's task is deliberately made harder by the absence of information which might be useful to him. The coroner's officer delivers to him one or more jars containing portions of organs with the request that these shall be tested "for poisons." Our strong national desire not to prejudice a possible defendant has resulted in the practice of giving the analyst no indication of the symptoms and no aid either in ruling out one particular poison or in concentrating upon the search for traces of another. The analyst who, if fitted at all to assist in the administration of justice, would hardly allow himself to be unduly influenced by such information, is thus unfairly handicapped. Dr. COOK suggests that recourse might be had to the plan adopted in proceedings under the Food and Drugs (Adulteration) Act. In those proceedings an inspector divides the purchased article into three parts; one of these is sent to the public analyst, a second to the tradesman, and a third is retained for analysis in case of dispute. Dr. COOK holds that it is anomalous to require less careful corroboration on charges of murder than when a man is prosecuted merely for adding boric acid to milk. With his suggestions for reinforcing and confirming the evidence in murder cases and for eliminating the chance of mistake there will be general agreement. They make, however, too little allowance perhaps for the natural feelings of relatives to whom the body of the deceased is something sacred. Public opinion may tolerate interference with a dead body in the effort to detect and punish the foul crime of the poisoner; it may be reluctant to contemplate such interference as a mere preliminary to cremation in a normal case. We have given up—though not so very long ago—the barbarity of drawing and quartering the bodies of our criminals: the average citizen is probably unprepared for what (however mistakenly) he might regard as similar treatment of the bodies of the innocent.

Annotations.

"Ne quid nimis."

MASS SUGGESTION AS A CLINICAL METHOD.

ALTHOUGH the subject is of fundamental importance we are still far from generally accepted conceptions of the influence of mental processes upon bodily functions. In the *Münchener Medizinische Wochenschrift* of August 9th Dr. Alfred Brauchle, advocating the use of suggestion therapy by the general practitioner, offers a theory of vitalism involving the conception of an organic unconscious. This is a mind-like principle existing in hydra, the germ-cell, or man, whose action is to unify the separate bodily functions, and it is the organic unconscious that we stimulate by non-specific therapy such as the injection of foreign protein or the use of sun baths. It can be stimulated, on the other hand, by way of the mental subconscious, and Dr. Brauchle quotes several workers who have shown the influence of hypnotic suggestion in neutralising the effect of drugs upon the functions of the vegetative system. His therapy consists in elaborating to a group of patients the theory here briefly outlined and then, with the patients in a state of relaxation, using the formulæ made popular by the late Mr. Coué. He gives a table covering the results of three years' work in the Hydropathic Institute of Berlin University, and believes that his results justify the claim that the Coué method is the most useful form of psychotherapy for the general practitioner, who can by this means treat many of his patients psychotherapeutically at a cost of two or three hours a week. As a practical way of dealing with the nervous troubles that bulk so largely in ordinary practice this method has the advantage of simplicity, but its theoretical basis is questionable. Dr. Brauchle's vitalistic theory prepares the patient for the reception of the healing suggestion; its intrinsic validity seems immaterial, and any theory acceptable to the audience would probably act equally well. Essential to all such methods is the induction of belief, and, though Dr. Brauchle's enthusiastic belief in his own theory is plain, yet there are many of us who could not feel its truth even if our lives depended upon the feeling. A weightier objection to simple methods of this nature is the risk of being content with the explanation involved in them. Dr. Brauchle notes, indeed, that the mental subconscious preserves forgotten and suppressed memories, experiences, and dreams, and produces disturbers of the peace that can operate as lasting causes of illness; but he makes no further use of what modern psychopathology has taught about the intricate causes of minor mental disturbances, and leaves his readers to believe that in suggestion we have an efficient and sufficient means of handling these troubles. Suggestive treatment, based upon the most varied theories, has had its successes as far back as the history of medicine goes; it may still have a part to play but no longer occupies the whole of the psychopathological stage.

PERNICIOUS ANÆMIA.

Dr. C. Price-Jones[1] has returned to the study of the red cell diameters in anæmia and the construction of the curves which bear his name, by going back to the beginning and performing the laborious and very useful service of determining the range of normal variation by measuring 500 red cells in each of 100 healthy persons. The general average is 7·20 μ, and anything between 6·69 μ and 7·72 μ seems to be compatible with health. A few cases of frank pernicious anæmia come within these limits—5 out of 50 in the series he quotes—and he points out that a high variability of the diameters is an even more constant

[1] Jour. of Path. and Bact., 1929, xxxii., 479.

character of pernicious anæmia than an excessive mean diameter, though of course hæmorrhagic anæmias, in which the diameters are too small, also have a variability greater than normal. Diagnostically a high coefficient of variation with a diameter of 7·5 μ or more would put a case in the pernicious anæmia class. The effect of treatment must be gauged in the light of the range of healthy variation. He gives the data for 12 cases treated with liver extract until the anæmia was cured and the symptoms had disappeared. In nine cases the mean diameter came back within the normal range, but with one exception none became as small as the normal mean. One patient whom liver treatment restored to an active working life despite well-marked cord degeneration, still had a mean diameter as high as 7·9 μ. Similarly, some but not all of the coefficients of variation became normal. Taking one criterion with another the red cells actually became "normal" in only six of the 12 patients. This is perhaps what might be expected if liver cures symptoms without removing the cause of the disease.

MEASLES IN LONDON.

A REPORT by the school medical officer, Dr. F. N. Kay Menzies, recently issued by the Education Committee of the London County Council, gives interesting details of the behaviour of measles. Lately epidemics have occurred regularly in London at intervals of 18 months, and have lasted about six months. The disease is notifiable in two metropolitan boroughs (Paddington and Fulham), and as regards the first case in a household in seven others (Greenwich, Hampstead, Lambeth, St. Pancras, Southwark, Battersea, and Finsbury). But even if it were notifiable generally, many cases would escape notification owing to parents wrongly regarding measles as a trivial complaint.

The cases coming to the knowledge of the school authorities during the last three epidemics were: (1923–24) 41,261, (1925–26) 39,387, and (1927–28) 41,477. As measles is especially a disease of pre-school (2–5 years) age, it is estimated there were about 100,000 cases during each epidemic. The districts in which the school population were least affected were Poplar, Stepney, Bethnal Green, Southwark, Chelsea, and Westminster, owing to the fact that in the congested and poorer areas the children suffer from measles before they reach school age. The deaths during the last epidemic numbered 1357, as compared with 1034 in the previous epidemic of 1925–26. The report shows that methods of prevention, such as school closure and exclusion of susceptibles on the receipt of reports of the first cases, have failed, and that immunisation is not as yet practicable. Since 1921 a scheme has been in force, the aim of which is, by coöperation between the school and the borough authorities, to get hold of the cases early and by timely succour to prevent or secure early treatment for the complications which are the chief cause of death and permenent injury. Under this scheme efforts are made to educate the parents that measles is not a trivial disease, and to provide home nursing and removal to hospital from unsuitable homes at the earliest possible moment, and especially to concentrate efforts on overcrowded and insanitary areas, where the effects of measles are notoriously disastrous. The success of the scheme appears to depend on the closeness of coöperation between the school and the borough agencies, and it is mentioned, for example, that in Wandsworth promptitude has been secured by direct consultation between the school nurses and the borough health visitors, with an apparent effect in diminishing the mortality. Sixteen of the 28 borough medical officers of health consider the scheme valuable, and in Deptford the earlier information obtained as to cases has enabled compulsory notification to be discontinued.

The provision of hospital treatment has proved difficult. Under existing arrangements at the height of each epidemic there comes a time when selection of cases for admission must be exercised. The state of the home, and the age of the cases (measles being notoriously fatal under 2 years) are among the guiding factors. Admission to hospital after broncho-pneumonia has begun must be prompt to be of any use at all. The M.A.B. records show that during the last epidemic 8729 patients were admitted, and that of these 626, or 7 per cent., died. Of the patients admitted suffering from complications, 31·7 per cent. died, whereas of those who were free from complications on admission only 1·9 per cent. died. Broncho-pneumonia was the cause of 542 of the 626 deaths. Of the 8729 admissions, 1042 had broncho-pneumonia when admitted, and 107 more developed it within the first day. The next epidemic is due towards the end of 1929, and some of the lessons from past experience are: that more use should be made of the local knowledge of the health visitors and school nurses in order that waste of time by unnecessary visitation may be avoided, and that the needed succour may reach its objective promptly. It is also urged that the school nurses be relieved of clerical duties, such as tabulation of lists, so that they may have more time for actual visiting, and that an endeavour be made to secure even closer coöperation between school nurses and health visitors.

THE BLOOD LIPOIDS IN PSYCHOTIC PATIENTS.

A CAREFUL piece of biochemical research in which the results obtained from psychotic patients are criticised and analysed by statistical methods has recently been published by Sven Stenberg from the Psychiatric Clinic, Konradsberg Hospital, Stockholm.[1] The range of variation both in normal controls and in psychotic patients has been estimated and allowed for, and since the exact limits of the experimental error of the method used have been ascertained, the conclusions reached by the author carry conviction. In a preliminary review of the literature, Dr. Stenberg shows how little of the published work on the subject fulfils the necessary conditions, and that the variations in results are thus explained. He points out that while different methods of estimation will give discrepant results, yet each, if used alike on controls and patients, and if studied by proper statistical methods, provides material from which valid conclusions may be drawn. The method adopted by him was the micromethod of Bang as modified by G. Blix, determining the total quantity of cholesterin separately and also together with the total fatty acids. While the method has been thought unreliable by some workers, he finds that the errors are eliminated by careful technique after practice, and calculates the standard error to be negligible in comparison with the variations found in different individuals and in the same individual under different conditions. In the normal controls he finds a striking individual constancy, but a considerable range of variation between individuals, the total fatty acids, but not the cholesterin, being higher in women than in men. In the manic-depressive group of cases the total cholesterin is greater than in normal persons and also greater than during remissions. In the dementia præcox group the early cases are differentiated from those of over a year's duration; in the former the total cholesterin was found higher than in normal and remittent cases. In the latter the group taken as a whole shows no significant difference from the normal group. This result is due to the cancelling out of two subgroups; the emotionally dulled cases gave values lower than the normal, while the emotionally heightened ones were higher than the normal, an intermediate group giving approximately normal ranges of values. The general conclusion reached was that a change in cholesterin content of the blood is to be correlated with emotional disturbance, though the exact nature of this correlation has yet to be discovered. The total fatty

[1] Psychosis and Blood Lipoids. Quantitative Variations of Total Cholesterin and Total Fatty Acids in the Blood in Manic Depressive Psychosis and Dementia Præcox. Stockholm: P. A. Norstedt. 1929. Reprinted from Acta Medica Scandinavica.

acids give less definite results, but generally follow the same course as the cholesterin. The author suggests that the effect of insulin both on blood lipoids and on the emotional state is a line of investigation that might prove fruitful.

ARTIFICIAL LIGHT IN TUBERCULOSIS.

ARRANGEMENTS were made by the London County Council in 1926 to put into operation an experimental scheme which would enable the metropolitan borough councils to utilise the approved facilities for artificial light treatment provided at certain hospitals and centres in London. We learn from the Council's recent annual report that this experimental scheme was tried in 1927 and continued throughout the year 1928. It appears, however, from reports received from the tuberculosis officers of the 19 boroughs that little use has been made of the scheme, an average of only six cases during a period of about nine months having been recommended from each of the boroughs taking part in the scheme. The reports of these officers are said to have disclosed practically no evidence of benefit having been derived by the patients from this form of treatment. The experience of 1928 confirms the view that good results are obtained only when light treatment is given as an additional method of treatment under suitable conditions in residential institutions in the country. The London County Council has therefore decided to proceed no further with the scheme, but rather to bring to the notice of the borough councils the importance of ensuring that all cases of active tuberculosis, whether pulmonary or non-pulmonary, particularly in the early and remediable stages, should be recommended for residential treatment at the earliest possible moment.

A STATISTICAL STUDY OF HEART DISEASE IN CHILDREN.

STATISTICAL methods have not hitherto found much favour in the study of heart disease on account of the difficulty of obtaining sufficient accurate data for statistical analysis. The Heart Committee of the New York Tuberculosis and Health Association is endeavouring to overcome this difficulty by adopting a uniform nomenclature and standardising so far as possible the descriptive terms used in case-taking. The committee hopes thereby to render the observations in different clinics more strictly comparable one with another, both history and physical examination being recorded in a uniform fashion on forms which have been carefully thought out for the purpose. Their work is now beginning to bear fruit, and the third of a series of statistical studies dealing in this instance with heart disease in children has recently been published.[1] It is based on an analysis of the case-histories of 500 children observed in a clinic under the same medical supervision during a period of ten years, 38 per cent. of the cases having been kept continuously under observation for more than three years.

In this series 50 per cent. of the children were between the ages of 6 and 10 at the time they were first seen, and 62 per cent. were over 11 years of age at the end of the period under review. Seventy-nine per cent. of the whole series gave a rheumatic history and of these three-quarters developed organic heart disease, the remainder being provisionally classified as "potential cardiacs." In the affected cases the heart lesion generally became manifest within 12 months of the onset of the rheumatic infection, and in point of fact was probably synchronous with it. In 50 per cent. of the rheumatic cases in this series the first infection occurred between the ages of 6 and 9, the average age of onset being 7·3 years. It appears that about the age of 12 a certain degree of immunity begins to develop, older children being less liable to infection, and the writers point out the importance of bearing this fact in mind when attempting to evaluate the results of therapeutic measures. Relapses occurred in 73 per cent. of the cases studied, and were most common within three years of infection. This figure, however, is probably an underestimate of the true incidence of relapses, for many of the cases in which no relapse was noted were under observation for only a short period of time. In the age-groups between 3 and 9, comprising 234 cases, the first relapse took place within one year of the onset in about 50 per cent. of cases, while in the smaller group where the first attack occurred after the ninth year, the percentage of cases in which the first relapse occurred within 12 months was 72 per cent. The writers suggest that the onset of puberty may possibly be a factor in predisposing to early relapse in these cases. Twelve per cent. of the children died, the most common age of death being between the eleventh and fourteenth years; 88 per cent. of the deaths were attributed to rheumatic heart disease. The writers are strongly of opinion that "growing pains" are of no less significance than chorea or polyarthritis as a manifestation of rheumatic infection, but they do not consider that any of the extracardiac manifestations of rheumatism can be regarded as giving an indication of the degree of heart involvement. Rheumatic nodules occurred in 60 patients, appearing most frequently at the end of periods of acute infection; 20 of these children died. With regard to valvular lesions, it is interesting to note that of 157 children, who appeared to have only mitral regurgitation on admission, 48 eventually developed stenosis; in 34 of these the stenosis took three years or more to develop.

The crippled hearts which result from rheumatic infection in childhood constitute one of the most tragic pictures in the wards of our great hospitals. Their future seems so hopeless, and it is encouraging to learn from the American analysis that so far as the functional results are concerned the outlook is on the whole quite good, for in 70 per cent. of the present series there was little or no impairment of the exercise tolerance. This justifies the belief that although we are still far from being able to prevent rheumatic infection, we can at least hope to limit its most serious sequelæ. The object of the New York Committee is to collect a sufficiently large mass of information concerning heart disease in order to be able to treat it statistically. There are bound to be differences of opinion as to the value of the results so obtained; but provided the data are reliable and sufficient care is taken to limit the inquiry to simple issues, from which complicating factors can be definitely excluded, information of real value will be obtained. While it may not be right to speak of definite "laws" in biology in the sense in which the word is used in physics or chemistry, we may at any rate hope by work of this kind to ascertain the general tendency of rheumatic disease and the extent of variation in individual cases.

[1] Amer. Heart Jour., 1928, iv., 164.

FAT AS AN ESSENTIAL ARTICLE OF DIET.

SINCE the discovery of the fat-soluble vitamins there has been a tendency to regard fat as being an unimportant dietary constituent, capable of substitution by carbohydrate, when once those vitamins of which fats are the ordinary vehicle have been adequately supplied from some other source. J. C. Drummond [1] in 1921 reared and bred young rats on a fat-free diet, supplying the fat-soluble vitamins as the unsaponifiable fraction of cod-liver oil. The subject has been attacked again recently by G. O. Burr in conjunction with H. M. Evans [2] (1928) and with M. M. Burr [3] (1929); in their experiments the growth of rats was checked and lesions developed when fat was completely excluded from the diet. Growth was promoted and the lesions were

[1] Drummond, J. C., and Coward K. H.: THE LANCET, 1921, ii., 698.
[2] Evans, H. M., and Burr, G. O.: Proc. Soc. Exp. Biol. and Med., 1928, xxv., 390.
[3] Burr, G. O., and Burr, M. M.: Jour. Biol. Chem., 1929, lxxxii., 345.

prevented or cured by the addition daily of 10 drops of lard or other fat, or of the fatty acids from lard, but not by the addition of glycerol or of the unsaponifiable fraction from lard. The Burrs go so far as to describe the condition produced as "a new deficiency disease produced by the rigid exclusion of fat from the diet." The symptoms described, of which an annulated and necrotic condition of the tail is particularly characteristic, are not unlike those which occur in pellagra of the rat, caused by an insufficiency of vitamin B 2, but the Burrs are emphatic that increase of the supply of the B-vitamins by means of ether-extracted yeast had no effect upon the syndrome. They do not, however, make it clear that ether extraction might cause yeast to be deficient in vitamin B 2. H. M. Evans and S. Lepkowsky[4] (1929) have come to the conclusion that the inclusion of large amounts of fat in the diet of rats has a very important effect upon the body's requirements of vitamin B 1. They describe the phenomenon as "the sparing action of fat on the antineuritic vitamin B" and show that even when there is no vitamin B 1 in the diet, vitamin B 2 being provided in the form of autoclaved yeast, the rat can survive if the diet contains as much as 50 per cent. of fat; if small but still insufficient amounts of vitamin B 1 are given to the rat, the amount of fat which will produce normal growth is less than 50 per cent. The "sparing" action is considered by Evans and Lepkowsky to apply only to vitamin B 1, for when the latter was given, as an alcoholic extract of rice bran, and vitamin B 2 was withheld, the weight curves of the rats are interpreted as showing that the addition of fat had little beneficial effect. In our view the weight curves do not quite bear out the interpretation that the saving action of fat applies only to vitamin B 1, for there is a very marked improvement in them when fat is added to the diet deficient in vitamin B 2. There is thus in both these sets of observations certain common ground for suspecting that the B-vitamins are involved in explaining the part played by the fat. Inclusion of fat in the diet might operate on the organism in many other ways than straightforwardly as a correction of a simple deficiency of fatty acids. The biological study of the B-vitamins is set about with the most thorny difficulties, such as are introduced by the habit of coprophagy and the phenomenon of refection, and it is perhaps rather hasty to interpret these observations on rats as evidence of a new deficiency disease.

PAROXYSMAL SNEEZING.

THE average text-book of medicine has little to say about sneezing, beyond the vague statement that a sneeze is an involuntary reflex respiratory act. Yet the sneeze is a symptom of many disorders from hay-fever to the common cold; it may be the first sign of measles or only the result of stimulation of the optic nerve by a bright light. The Greeks and Romans considered the sneeze as a definite omen from the gods and it was one of the common everyday phenomena, which if it occurred at a moment of special import could be interpreted as presaging the future. There are many allusions to sneezing in classical literature, but it is a line from a popular refrain well known to a former generation "He sneezed so hard with the whooping-cough" which is most relevant to the case recently described by Dr. Alan Moncrieff and Dr. R. C. Lightwood.[5] A little girl began an attack of whooping-cough in the ordinary way at the end of January, 1929. At the beginning of March she ceased to whoop and began to sneeze instead. Her sneezing attacks occurred about ten times a day and each attack caused great distress and incontinence of urine. She had suffered from these attacks for three weeks when she developed the broncho-pneumonia which led to her admission into hospital. There the paroxysms of sneezing continued, although she did not cough or whoop. The paroxysm consisted of a rapid series of "expiratory sneezes" resulting in the expulsion through the nose of large quantities of tenacious muco-pus. At the end of the paroxysm the patient drew in her breath and lay back cyanosed and exhausted. As the broncho-pneumonia got better a slight whoop developed and for a time she had both whooping and sneezing attacks. At the end of six weeks from the onset of the pneumonia the whoop had disappeared, although occasional mild sneezing attacks continued. Bacteriological examination of the muco-pus discharged from the nose in one of the paroxysms demonstrated the presence of Gram-negative bacilli of the pertussis type. This variation in the normal course of whooping-cough was apparently well known to the physicians of many years ago, for there is an allusion to it in an interesting treatise on the disease by Dr. Thomas Watt, of Glasgow, published in 1813. Several continental authors refer to the condition which has also been described by J. P. C. Griffiths and A. G. Mitchell, and by J. D. Rolleston. Szegö, of Budapest, suggested in 1900 that such sneezing attacks made it probable that the spasmodic features of pertussis had a central origin. More recent writers have mentioned other equivalents of the whoop in pertussis and the list includes paroxysmal hiccough and paroxysmal yawning. Dr. Moncrieff and Dr. Lightwood give a short review of the literature of the subject and note that adults with apparently intractable coryza may really be suffering from whooping-cough and may infect children. Apart from their rare appearance in whooping-cough, true paroxysms of sneezing are mainly associated with anaphylactic disorders such as hay-fever; when they develop suddenly in children not sensitive to pollen, the possibility of whooping-cough should be considered.

[4] Evans, H. M., and Lepkowsky, S.: Jour. Biol. Chem., 1929, lxxxiii., 269.

[5] Paroxysmal Sneezing in Whooping-cough, Arch. Dis. Child., August, 1929, p. 240.

STERILISATION OF THE UNFIT.

WHILE those most intimately concerned with the care of the mentally defective in this country continue steadily to oppose sterilisation as an auxiliary measure to the more important segregation, a number of interested people continue to press its claims. They are encouraged by the results of American experiments, which have caused the majority of social workers and medical men concerned with the problem of amentia in the United States to advocate a carefully safeguarded authority for sterilising suitable cases. Dr. K. B. Aikman returns to the subject in the *Edinburgh Review* for July. He begins by attacking the doctrine of the equality of man, and goes on to deplore the racial suicide of the middle classes. He does not believe that the peculiar qualities of these classes can be perpetuated for the nation by constant recruitment from lower strata. He attributes the "suicide" to a complex of many factors: increasing density of population with increasing competition, calling for longer training for learned professions and technical occupations, and hence later marriages and a greater cost of launching children into the world, while the earning power of the manual labourer is at its highest when his physical growth is complete. A higher standard of living, a reduced value of money, and an increasingly materialistic outlook have led to the reduction of families, which has been facilitated by modern methods of birth control. Coincidently with this decrease in the middle-class population there has been an actual increase in that of the poorer classes, for every new triumph of hygiene has produced its first results among the poor. The decrease in the infant mortality-rate is a reflection of the number of lives saved to the working-class population, and Dr. Aikman would temper our self-congratulation on this achievement because it is based on statistics which pay no heed to quality. He finds cause for anxiety in all directions: the recruiting figures of 1917–18, the lack of fit emigrants, the ill-health of

school-children, and the amount of time lost through sickness among the insured population. He finds the increase in the number of insane and mentally defective persons most disquieting. The difficulties in the way of remedy appear to him to be purely ethical; we are not able to increase the death-rate by failing to encourage the survival of the less fit, and all we can do is to fail to encourage the arrival of the less fit. He claims that measures designed primarily to increase the number of better citizens should be directed broadly to the assistance of those sections of the community which contain the greatest proportion of desirable characteristics. Since persons handicapped by disease and antisocial qualities will always tend to gravitate to the worst paid employments and most slovenly surroundings, the poorest classes must always contain a large proportion of the least desirable citizens. In view of this fact, and of the fact that the main bulk of the people lie close to the average of any given quality, and that it is impracticable for everybody to have as many children as is physically possible, a slight increase in fertility of the fairly large numbers who are just above the mean and a slight decrease in the equally large population which is just below the mean will do more for the race than trebling a few highly superior families. The legislation at which Dr. Aikman would aim must accord with the dictates of humanity, must increase the fertility of the middle classes, and must avoid the selection of individual beneficiaries by bureaucrats. Numerous economic measures have been tried or suggested; all of them are capable both of good and of harm and all have proved disappointing in practice. Economic measures alone cannot solve the problem. The solution must depend on the recognition of responsibility. In this country we have no law requiring that persons discharged from mental institutions should even be warned that their weakness may be transmissible, and indeed it is common enough for defective girls to be discharged by magistrates on condition that they marry. The only way out of our parlous situation seems to Dr. Aikman to be the sterilisation of persons who are well enough to be discharged from mental institutions but who are certain or highly likely to produce defective offspring. He grants that segregation is an ideal measure, but regards it as wholly impracticable if only on the ground of expense. He considers that legislation to check procreation by the unfit should have an educational influence on the general public out of all proportion to the number of individuals actually affected. In answer to the criticism that this interferes with the liberty of the subject, he points out that this question must be considered from the point of view of the greatest happiness of the greatest number, and, in Dean Inge's words, "by far the greatest number are not yet in existence."

BENEFACTORS OF MANKIND.

THE *Manchester Guardian* has recently held a competition to choose six persons who might lay claim to the distinction of being called the greatest benefactors of mankind, Lister being the type suggested, and therefore excluded from the list. The six representing the votes polled were:—

1. Pasteur.	4. Rontgen.
2. J. Y. Simpson.	5. Jenner.
3. Mme. Curie.	6. Ross.

The readers of the *Manchester Guardian* are well known to be the most intelligent group of citizens in this country, and it is gratifying to find that they set such a high value on the relief of pain and suffering. It is also interesting to note that they put this particular interpretation on "benefactor," though this may be due to the suggestion made in the setting of the competition that Lister was a good example. On this view a "benefactor" is one who makes life more tolerable. The concise Oxford Dictionary says "person who has given one friendly aid," which is compatible with the view that the best benefactors of mankind are those who have enlarged human life, more especially in the intellectual and spiritual spheres. Of the chosen six, Curie alone would satisfy this criterion, and she comes third, probably because radium is good for cancer, and not because its discovery is one of the great events in our understanding of the natural world. Darwin would come here too, though he was suggested by only a few of those who sent in lists. The problem set is, of course, insoluble, as most interesting problems are. But whatever the answer which is most nearly right, it is encouraging to see medicine so highly thought of.

INTERNATIONAL SOCIETY OF MEDICAL HYDROLOGY.

THE sixth annual meeting of the Society will take place at Budapest from Oct. 13th–18th, under the patronage of the Archduke Dr. François Joseph and members of the Government. Medical discussions on the 14th and 15th will deal with the Action of Hypertonic Waters and the Use of Baths and Waters in Cardiovascular Affections. A meeting of the Ligue Internationale contre le Rhumatisme will be held on the 16th to consider the Relation between Acute and Chronic Rhumatism in the Various Countries and the Hæmatology and Serology of Rheumatism. The Society will be entertained by the Prime Minister, the City of Budapest, and by the Balneological Society of Hungary. Excursions will be made to the "Bitter Water" springs, the bathing establishments, Lake Balaton, and other places of interest. At the conclusion of the meeting the party are invited to visit Vienna to view the hospitals and clinics and the establishments at Baden. Special reductions in cost are offered to the Society and their friends. The English party will leave London on Friday, Oct. 11th, and a few vacancies are available for medical men or women who are interested in hydrology. Particulars on application to the Hon. Secretary of the Society, 139, Marylebone-road, London, N.W.1.

FACIAL ERYSIPELAS.

IN a contribution to the *Jour. Amer. Med. Assoc.* of August 10th Dr. David Seegal and Dr. Beatrice Seegal have analysed a series of 281 cases of facial erysipelas admitted to the wards of the Massachusetts General Hospital between the years 1870 and 1927 into nine somewhat arbitrary categories. Their results are illustrated by graphs of value to the statistician or to an epidemiologist, if of little interest to the practitioner. In their summary of conclusions the following points are worthy of note. The months of greatest frequency were from May to December, when, though this may be a coincidence, sore-throats due to the *Streptococcus hæmolyticus* are most frequent. Thirty-eight of the cases (13·5 per cent.) occurred in the hospital personnel; of these, 22 were nurses, 12 were members of the domestic staff, 3 were laundry workers, and 1 was a physician. The inference seems to be that these cases were the result of actual contact, direct or indirect. Forty-eight per cent. of the 281 cases occurred in patients after admission to hospital; about half this number were medical patients, the rest surgical, in whom slightly more than half had recently undergone some facial operation. The temperature was usually high during the first two days of the disease, and in about three-quarters of the total number of cases reached 104°–105° F. at some period of the evolution of the attack. The untreated case left to its natural course sometimes terminates abruptly by crisis in from 4–7 days. The mortality in the series was 19·6 per cent. This figure includes patients who were suffering from some other serious disease at the same time. When these are excluded the percentage of deaths works out at only 5. As is generally known, the prognosis is most serious at the two extremes of life.

This analysis, extending over 60 years, is interesting, but it is doubtful if the conclusions reached are of much

practical importance at the present time. All modern observers will agree that true fulminating and terminal cases, such as were doubtless common before the days of antisepsis, are exceedingly rare in our day. Whether this is due to the diminished virulence of streptococci, to which the mildness of present-day scarlet fever is attributed by some epidemiologists, is of theoretical interest. It is significant, however, that the dermatologist sees a considerable number of mild cases of a relapsing type, and it would be worth while to ascertain if these, when added to the number of cases falling into the true acute group, would bring the total number of cases of erysipelas occurring in the periods 1875–1885 and 1919–1929, in a given hospital, to approximately the same total figure. Protein shock treatment has given a very much better outlook to all cases of erysipelas. Experience seems to indicate that a specific serum is not more potent than any foreign protein capable of producing the chain of phenomena we term shock, and that it is therefore unnecessary to jeopardise convalescence by injecting horse serum when milk protein will have the same therapeutic effect. In cases of the subacute relapsing type on the face, if the focus of the infection is not discovered and treated, continual recurrences with ultimate local complications, such as lymphangitis and a form of intractable elephantiasis, are to be feared. Unfortunately, the utmost diligence and patience sometimes fail to reveal a focus, and it is in these cases that the prognosis as regards complete restoration is unsatisfactory.

SEXUAL REFORM CONGRESS.

THE Third International Congress of the World League for Sexual Reform, which is being held at the Wigmore Hall, London, during the present week, opened on Sunday evening in the presence of about 120 members with an address of welcome from one of the Presidents, Dr. Magnus Hirschfeld, of Berlin, the hon. treasurer, Mrs. Dora Russell, and the hon. secretary, Dr. Norman Haire. Dr. Hirschfeld recalled the last occasion when he spoke in London, at the International Medical Congress of 1913, when the meeting was interrupted by suffragettes. Much of the progress for sexual reform since made he attributed to the political emancipation of women which had taken place in this and other countries. It was, he said, only during the present century that sexual science was winning for itself an independent position among the natural sciences. Sexual biology was still in its infancy, and much of what had been written on the subject had been dictated by points of view other than purely scientific. Sex abnormality was, he said, a fact which must be reckoned with, and should neither be over- nor under-estimated. One point he wished himself to emphasise at the outset of the Congress was that men and women whose sexual temperament diverged from the normal should neither marry nor have children. Mrs. Russell also recognised the fruitful effect of woman's political emancipation on her economic and sexual equality. Scientific investigation of sex problems would not in itself affect conduct, but was a necessary preliminary to other measures. While she hoped that a congress in London would bring publicity to the movement, she felt that its most substantial advantage would result from the free discussion between men and women of subjects which concerned them both equally. Dr. Haire set out briefly the objects of the League, the first of which is a political, economic, and sexual equality of men and women, which included the liberation of marriage and especially divorce from the present tyranny of Church and State, the control of conception so that procreation may be undertaken only with a due sense of responsibility, and a rational attitude towards sexually abnormal persons. Many of the aims are common to other spheres of social activity, but it is a thesis of the League that only those sexual acts should be considered criminal which infringe the sexual rights of another person. In the programme of the Congress, which is a very full one, a whole day is allotted to the vexed question of sex and censorship, to which a number of distinguished literary men are contributing.

THE EFFICIENCY OF CARDIAC MASSAGE.

THE observations of the coroner in a recent case in which heart massage restored the circulation after failure during anæsthesia raise the important question of the time at which this extreme measure should be employed. The fact that effective cardiac massage cannot be applied to the adult without opening the abdomen makes it obviously desirable to employ this form of resuscitation only as a last resort unless the abdomen has already been opened during the operation. At the same time if it is to be used with any benefit certain time limits must not be overstepped. It is generally held that artificial respiration should have been efficiently employed for fully five minutes before cardiac massage is attempted. There are now quite a large number of cases on record in which restoration of the circulation was attributed either to cardiac massage or to intracardiac injection of adrenalin. It is not certain in all these recorded cases that properly carried out artificial respiration would not have been successful, even without direct stimulation of the heart muscle. The ultimate prognosis in these patients depends on the power of recovery of the brain cells, which are those most readily damaged by stoppage of the circulation. It is generally held that the cortical cells cannot be revived after about 15 minutes of circulatory deprivation. Dr. T. Lumsden notes (see p. 585) that in his experiments on cats the cerebrum never revived if the circulation had entirely ceased for five minutes. In the well-known case at Guy's, in which a child ultimately recovered after weeks of illness indicating the cerebral damage that had been sustained, it was reckoned on good evidence that 13 minutes elapsed between the collapse during anæsthesia and the moment when cardiac massage restored the circulation. Prof. J. A. Gunn, whose investigations into the condition of arrested circulation have been valuable, recommends that in performing cardiac massage the compression should be gradual and the relaxation abrupt, that the rate should be less than half the normal heart-rate, and that there should be interruptions at short intervals to allow spontaneous beats to develop. Prof. Gunn also recommends an intravenous injection of atropine after the heart has restarted as the best means of averting secondary stoppage from excessive vagal action which has been responsible for death after the primary circulatory failure has been corrected.

WE regret to announce the death of Mr. Charles Alexander Morton, emeritus professor of surgery in Bristol University and consulting surgeon to the Bristol General Hospital. His death occurred on Sept. 7th in Switzerland, where he was on holiday.

CHARTERED SOCIETY OF MASSAGE AND MEDICAL GYMNASTICS.—The Members' Congress will be held in London on Oct. 15th to 19th, all the lectures except the lantern lectures being given in the Great Hall of the B.M.A. House, Tavistock-square. Sir Henry Gauvain will give the first lantern lecture on The Treatment of Tuberculous Cripples: Sun and Sea Bathing, at 11 A.M. on Oct. 15th, at the Central Hall, Westminster, and the other lectures to be given at this hall include one by Mr. Naughton Dunn on Principles in the Treatment of Common Deformities at the same time on Oct. 17th, and one by Dr. A. F. Hurst on Asthma at 6.30 P.M. on Oct. 17th. Other lectures will be by Mr. H. Chapple on Twilight Sleep, Dr. Cicely M. Peake on Rheumatism in Children, Dr. Justina Wilson on Diathermy, Mr. P. Jenner Verrall on Low Backache, and Dr. G. J. Langley on Cardiac Insufficiency. Sir Cooper Perry will preside at the annual general meeting on the 19th, and the first annual dinner of the Society is to be held at the Café Royal, Regent-street, on Wednesday, Oct. 16th, at 7.45 P.M.

The Clinical Interpretation of Aids to Diagnosis.

A Series of Special Articles contributed by Invitation.

XLIII.—SIGNIFICANCE OF THE ACID-BASE BALANCE IN THE BLOOD.

PART II.*—DIAGNOSIS OF ACIDOSIS, ALKALOSIS, AND KETOSIS.

Acidosis.

WE have agreed to use the term acidosis for a condition in which the bicarbonate concentration of the body fluids is reduced by retention of acid or loss of base. The obvious method of detecting such a condition is to measure the plasma or blood bicarbonate. We have, however, to remember that the plasma or blood bicarbonate may be reduced in order to raise the cH towards normal when the free carbonic acid concentration has been reduced by overbreathing (type 1 (*b*)). In many cases there is no doubt as to which condition is present—for example, in diabetic ketosis in which we know that an excess of acids is being formed—but in other cases the answer is not obvious. For example, a moderate reduction of plasma bicarbonate, down to about 45 is found in anæsthesia; abnormal acid formation or retention sufficient to account for such a reduction has not been demonstrated, and it was at one time widely maintained that this reduction was the result of compensation for hyperpnœa. However, in these cases the range of pH is found to be below normal—that is, cH is above normal—which leaves no doubt that the reduction of c($NaHCO_3$) is primary. In cases of doubt, therefore, it is necessary to measure the pH of the blood as well as the bicarbonate.

Measurements of plasma or blood bicarbonate present several difficulties owing to changes in the blood on exposure to air or on standing, and it is advisable that the sample of blood should be taken by someone familiar with the technique; still greater precautions are required even for rough pH measurements.

As shown in Table II. last week there is always some compensatory reduction of free H_2CO_3 in acidosis, although the attempts at compensation may fail to bring the pH back to normal. If there is no interference with the respiratory exchange the alveolar air is in equilibrium with the plasma, so that the CO_2 tension in the alveolar air is proportional to the amount of CO_2 dissolved as H_2CO_3. Consequently the CO_2 tension in the alveolar air is reduced in acidosis; but, since the CO_2 tension is only reduced proportionally to the bicarbonate when the acidosis is fully compensated, it does not give such a good measure of the degree of acid retention as does the plasma bicarbonate. Also the patient's coöperation is needed in obtaining samples of alveolar air, which may be an insuperable objection. For these reasons estimation of the plasma bicarbonate is usually preferred. As set out in Table II. the amount of CO_2 per 100 c.cm. of normal plasma is 55 to 65 c.cm., while in conditions of acidosis it varies from 14 to 45.

Sellard's Test.—After taking 5 grammes of $NaHCO_3$ by the mouth a normal person usually excretes alkaline urine; but in acidosis the urine remains strongly acid (acid to methyl red) until enough $NaHCO_3$ has been taken to bring the plasma bicarbonate up to normal, which may require some 60 grammes. This gives a method of measuring the degree of an acidosis (Sellard's test) which is, however, rarely used.

Acidosis may be produced by any acid that is not poisonous in small concentration; the type most commonly seen among hospital patients is that due to retention of phosphoric and sulphuric acid in severe renal impairment. Such an acidosis usually occurs in cases of chronic nephritis with nitrogen retention as they approach the common end of all cases of this type, and may reach a severe degree as shown in Table II. of Paper I. The lowest pH recorded in man, 6·7, was found shortly before death in a patient with nephritis.

Alkalosis.

Failure of compensation, with consequent rise of pH, is usual in alkalosis, and the symptoms then are similar to those that occur in voluntary hyperpnœa and at high altitudes before accommodation is gained. Headache, dizziness, disturbed sleep, and a sense of weakness occur with the slighter degrees of elevation of pH; with more advanced degree, drowsiness, coma, tetany, and even general convulsions.

Alkalosis does not, like acidosis, occur in normal persons, and does not occur so often as a result of disease. It is caused by loss of hydrochloric acid in vomiting, particularly in the profuse vomiting that occurs with high intestinal obstruction or dilatation of the stomach due to other causes, and probably contributes to the extreme collapse in these conditions. On the other hand, alkalosis is more likely than acidosis to result from therapeutic measures, since the local effects of acids discourage their administration in large doses, the potential acids ammonium chloride and calcium chloride are unpleasant to take, while sodium bicarbonate which appears innocuous may be given in large quantities. When alkalis are given as a treatment for acidosis they should be stopped when the urine ceases to be strongly acid; it is best to use the indicator methyl red, which gives a red colour with a strongly acid urine (pH under 5·5).

Alkalosis can be detected and measured only by estimation of the plasma or blood bicarbonate, preferably with estimation of the pH as well. The CO_2 may rise to well over 100 c.cm. per 100 c.cm. of plasma. When large doses of alkalis are given, for example, in the treatment of pyloric ulcer, it is advisable to check the effect by plasma bicarbonate estimations; should this not be possible, it is necessary to watch for the symptoms of alkalosis—headache, nausea, weakness, and drowsiness.

The condition *alkalæmia*, an increase of the pH of the blood, can only be diagnosed with certainty by an actual estimation of the blood pH. So-called

TABLE III.—*Showing Results of Tests in Ketosis of Various Degrees of Severity.*

—	pH.	Bicarbonate c.cm. of CO_2 per 100 c.cm.		Acetone grammes per 100 c.cm. of blood.	Alveolar air.		Sellard's test. Grammes $NaHCO_3$.	24 hrs.: Urine.		
		Plasma.	Blood.		CO_2 tension mm. Hg.	CO_2%.		$FeCl_3$ reaction.	NH_3 nitrogen grammes.	Acetone bodies as acetone. grammes.
Normal	7·30–7·45	55–65	46–64	0	38–49	5·0–6·4	5	0	0·14–1·1	0
Moderate	7·35	46	39	0·04	33	4·3	30	+	1·5	6
Medium	7·27	35	30	0·07	26	3·4	50	++	3·5	16
Severe (very drowsy) .	7·15	25	22	0·09	20	2·6	65	+++	5·5	25
Very severe (coma) ..	7·0	12	10	0·13	14	1·85	—	++++	—	—

* Part I. appeared last week.

renal asthma is a condition of this type; the hyperpnœa is not brought on by acidosis but by an interference with the blood-supply to the respiratory centre, and occurs particularly in hyperpiesia.

Ketosis.

Ketosis, the appearance of acetone bodies in the urine, occurs particularly when the ratio of carbohydrate metabolised to fat metabolised is low; as in diabetes mellitus, starvation, and when the proportion of carbohydrate to fat in the diet is much reduced. It also occurs in fevers, especially in children, and to moderate degree in various other conditions, not uncommonly in normal pregnancy, and frequently in alkalæmia. It is undesirable that the term acidosis should be used for the appearance of acetone bodies in the urine, since this appearance need not be accompanied by any reduction of plasma or blood bicarbonate, and excessive formation or retention of acids may occur quite independently of the acetone bodies; also acetone bodies may appear in the urine in a patient with alkalosis. This is not merely a matter of nomenclature; Prof. A. E. Ellis has recorded the case of a drowsy patient in whose urine acetone bodies were found; the diagnosis of acidosis was made, and she was given sodium bicarbonate; as the ketosis became worse and the patient more drowsy, the sodium bicarbonate was repeated in heroic doses until she became comatose, developed tetany, and died. Shortly before death her plasma bicarbonate was found to be very high. It is very probable that this patient was suffering from alkalosis from the beginning.

Rothera's Reaction.

Ketosis is usually diagnosed by the detection of acetone and aceto-acetic acid in the urine. It is unfortunate that there is no qualitative test for β-hydroxybutyric acid, which is excreted in larger quantities than acetone and aceto-acetic acid in the more severe degrees of ketosis. The test that should invariably be used is Rothera's nitroprusside reaction, which is given by both acetone and aceto-acetic acid. The ferric chloride reaction which is given by aceto-acetic acid is also given by many other substances, particularly salicylic acid and its derivatives, such as aspirin. When present in small quantities the colours given by these substances are indistinguishable from that given by acetoa-cetic acid, and the methods for differentiating them are unsatisfactory. It is therefore advisable not to use the ferric chloride test unless the nitroprusside reaction is positive, and then to draw no conclusions if there is any likelihood that the patient has taken any such compound as aspirin.

In order to estimate the severity of a ketosis we may first estimate the amount of acetone bodies excreted in the urine. The straightforward estimation of the total acetone bodies is a long process not suitable for daily repetition. The depth of colour of the nitroprusside reaction gives some indication; if the colour is only pink the degree of ketosis is slight. The most popular index is the strength of the ferric chloride reaction. As might be expected the results are not very satisfactory, since the substance measured by this reaction is not the principal one excreted when the ketosis is severe. A definite reaction indicates that a large amount of acetone bodies (over 6 g. in 24 hours) is being excreted and a strong reaction that the amount is excessive; but a large amount may be excreted with no ferric chloride reaction.

An indirect estimate of the amount of acetone bodies in the urine can be obtained from the amount of ammonia in the urine, which is increased when the total amount of any acids excreted is increased; the parallelism between ammonia and acetone body excretion is particularly good. It is, of course, essential that the patient should not be receiving alkalis at the time, and that the urine should be collected with some preservative such as toluol, to prevent the formation of ammonia from urea by bacteria.

When substantially the whole of the 24 hours' urine cannot be collected, it is not possible to draw any conclusion from the ammonia concentration; some help may be given by the ratio of ammonia nitrogen to urea nitrogen; this ratio is normally about 1/30, and rises as the acid excretion rises; but it must not be forgotten that this ratio also falls when the protein intake is reduced, and no conclusions should be drawn unless the ratio is about 1/10; in extreme cases it may rise to unity.

Table III. gives examples of various degrees of ketosis. The amount of acetone bodies retained in the body fluids is of more importance than the amount that is being excreted harmlessly in the urine. A moderate amount may be excreted without any appreciable retention, and patients vary greatly in the relation between amounts excreted and amounts retained. The straightforward estimation of acetone bodies in blood is too long for repeated use. If the patient is not taking alkalis the plasma bicarbonate will give an indication of the degree of retention and has been largely used; but the bicarbonate reduction is not necessarily proportionate to the amount of acetone bodies, as other acids besides β-hydroxybutyric and aceto-acetic may be formed.

As a rough quantitative measure the nitroprusside reaction may be applied to the filtrate obtained in the Folin-Wu method of sugar estimation; a pink colour developing in about 15 minutes shows an excess of acetone bodies. This test might well be used more generally.

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Chemical Pathologist to the London Hospital.

DONATIONS AND BEQUESTS.—Mr. Mark Firth, of Carlton-park, Northampton, left £1000 to Firth's Almshouses, Sheffield, and £100 each to the Royal Infirmary, Sheffield, the Royal Hospital, Sheffield, the Jessop Hospital for Women, Sheffield, the Free Hospital for Sick Children, Sheffield, and the Kettering Hospital.—The late Miss Marianne Hamilton, of Maelog Cottage, Beaumaris, Anglesey, left, among other bequests, £1200 to the Royal Alexandra Convalescent Home, Rhyl; £1000 each to the Anglesey and Carnarvonshire Infirmary, the Society for the Prevention of Cruelty to Animals, Dr. Barnardo's Homes, the Mission to Lepers, the Church of England Zenana Missionary Society, the Oldham Deaf and Dumb Institution, and the Oldham Home Teaching for the Blind; and £500 to the Beaumaris and District Nursing Association. The residue will be divided between the Royal United Kingdom Beneficent Society, the Oldham Royal Infirmary, Henshaw's Bluecoat School, Oldham, and the Northern Hospital for Incurables, Mauldeth, Manchester.—Mr. Charles Wellington Polkinghorne, of The Terrace, The Hoe, Plymouth, left £500 each to the South Devon and East Cornwall Hospital and the Royal Albert Hospital.—The Governors of the Manchester Royal Infirmary have received a legacy of £5898 from the late Mrs. M. A. Gratrix, and one of £1000 from the late Mr. Edwin Ogden.—On the decease of a legatee, Mr. William Malin, J.P., of Overdale, Derby, left £600 to the Derbyshire Royal Infirmary for the endowment of a cot in memory of his son. Mrs. Virginia Schilizzi, of Paris and of Athens, and Highgate, London, left £1000 to King Edward's Hospital Fund for London, and £500 each to Westminster Hospital and the Grosvenor Hospital for Women and Children, Vincent-square, London, S.W.—Mr. George Brookfield, of Queen's Drive, Mossley Hill, Liverpool, left £500 each to the Child Welfare Association, Liverpool Hospital for Diseases of the Heart, Liverpool Children's Hospital, and the Boys' Home and Refuge, Liverpool. One-half of his residuary estate is to be divided between the Liverpool Royal Infirmary, the Liverpool Hahnemann Hospital, the George Walker Memorial Hospital, and the Liverpool Central Relief Society.—Mr. Frank Walker, of Normanton-road, Derby, left £500 each to the Derbyshire Royal Infirmary, the Derby and Derbyshire Hospital for Sick Children, and the British Empire Cancer Research Society.—Mr. Thomas Lewis, of Haslingden-drive, Bradford, left £150 to the Leeds General Infirmary "as a grateful appreciation of the successful serious operation performed upon me by Dr. Littlewood at the infirmary" and £150 to the Bradford Royal Infirmary.—Mr. Joseph Cottrell, of Rugeley, Staffs, left, on the death of his wife, £1000 to the Derbyshire Royal Infirmary for the endowment of two beds in his name and £1000 to the Stafford General Infirmary for the endowment of two beds in his name.

Special Articles.

ON THE VALUE OF TONSILLECTOMY

IN THE PREVENTION OF ACUTE RHEUMATISM, RHEUMATIC CARDITIS, AND CHOREA.

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IT is very widely held that the tonsils are the portal of entry of the hypothetical causal organism of rheumatic fever, and Poynton's declaration "I am convinced by clinical and experimental evidence that the tonsils are the site of access; statistics will not shake me in this belief," clearly defines the attitude of a number of medical men who have had wide experience of the rheumatic disease. Further, it is commonly claimed that the tonsils of rheumatic children are unhealthy and show evidence of chronic or subacute inflammation.

The theory that the infection enters by the tonsils is difficult either to prove or disprove. Until a definite organism can be incriminated, satisfactory experimental evidence cannot be obtained, and it must be remembered that although a fairly strong case has been made out by certain investigators against various streptococci, no organism is as yet generally accepted by the bacteriologists as the specific organism. The statement that the tonsils of rheumatic children are in a worse condition that those of their healthy brethren may be true, but unhealthy children tend to have unhealthy tonsils and a fundamental relationship between the tonsil and the disease from which the child suffers is not thereby proved. At the Bath Conference on Rheumatism Wilfred Vining stated that in his experience tonsillitis and sore-throats are as commonly met with among non-rheumatic as among rheumatic patients, and MacSweeney published figures, collected while examining school-children in Cardiff, that suggest that the alleged association between enlarged and septic tonsils and acute rheumatism does not exist. Boas and Schwartz, in a paper on the modes of infection in rheumatic fever, regard the tonsils as playing a relatively minor rôle as a source of infection, and other workers, both in this country and in America, have shown that there is not such a marked difference between the tonsils of rheumatic children and others as to warrant the dogmatic statement that the tonsils of rheumatic children are hypertrophied and either acutely or chronically inflamed.

Some Published Investigations.

But even if the tonsils were the common portal of entry it is questionable if the permanent closure of a gate after an enemy has entered will save the city. Schichhold, in a paper published in Munich in 1910, claimed that the removal of the tonsils would cure an attack of rheumatic fever and prevent recurrences, and this hypothesis has been accepted by many. Robey and Freedman endorsed it. They concluded from their investigation of 454 cases that complete enucleation is the best preventive treatment for rheumatic fever and endocarditis, and considered that tonsillectomy should be performed when there is a history of sore-throats, even when the tonsils appear normal, and when the tonsils appear diseased, even though sore-throats are absent. They refer to the beneficial results they obtained by tonsillectomy conducted during the height of an attack of acute rheumatism. Kerley, writing in February, 1929, asserts that the tonsils should be immediately removed from a patient suspected of having rheumatism, regardless of whether they appear healthy or not. Reginald Miller is of opinion that tonsillectomy is of great value in preventing arthritis and all forms of carditis, but that it leaves chorea totally uncontrolled. This suggestion is also supported by the findings of the Medical Research Council. In its report it is stated that it is curious to note the preponderance of attacks of chorea over other forms of rheumatic manifestations in 60 persons whose tonsils had been removed; 36 of these developed a first attack of rheumatism some time after the removal of the tonsils and had it in the form of chorea only, four others had chorea as well as other manifestations. A. P. Thomson states that tonsillectomy is advised in all children admitted to the rheumatic hospital at Baskerville unless definitely contra-indicated, and he holds that the value of early and complete tonsillectomy in the prevention of rheumatic heart disease is definitely established.

As opposed to this view we have the statement made by Poynton at the discussion on rheumatic infection in children at the B.M.A. meeting in Bath in 1925. He said: "I know that skilled enucleation will not prevent a first attack of rheumatism and acute carditis of extreme severity occurring years later, and I know also that an acute and crippling attack of carditis may directly follow removal of the tonsils in the rheumatic." Wilfred Vining, dealing with debilitated and pre-rheumatic children said: "I have seen children whose debilitated state seems to date from the removal of their tonsils and adenoids, and a recent review of cases has increased my belief that the routine removal of the tonsils and adenoids is a mistake," and in his paper given at the Bath Conference he referred to children he had had under his personal observation who developed the first attack of rheumatism after the tonsils and adenoids had been removed. Hunt and Osman reviewed the after-histories of 144 rheumatic children treated at Guy's Hospital, 66 of whom had had their tonsils enucleated, and they concluded that the operation did not diminish the liability to rheumatic infection and that to operate upon apparently healthy tonsils was quite unjustifiable and could not be too strongly condemned. Among the rheumatic children investigated by MacSweeney in 12 cases the removal of the tonsils was antecedent to the first attack of rheumatism, and yet six of these children developed endocarditis. Dr. May Wilson and others kept careful records of 413 rheumatic children that were under their observation between the years 1916 and 1927, some of the cases being under observation all through this ten-year period. 247 were subjected to tonsillectomy, and the results as judged by the occurrence and recurrence of manifestations of infection after operation lead to the conclusion that tonsillectomy is not advisable as a routine therapeutic measure for the prevention of rheumatic heart disease, and that advocates of the operation do not base their claims on conclusive data.

Author's Inquiry into After-histories.

During the last two and a half years over 400 rheumatic children have been under treatment at Queen Mary's Hospital, Carshalton. With the help of Miss Mary Allan, M.A., I have made a résumé of the histories and case-notes of all these patients and the records of their progress after discharge for a certain number of the children who have been under the supervision of the London County Council. In Table I. are recorded certain facts referring to the first 300 rheumatic children admitted to this hospital, who had had no operative interference with their tonsils.

TABLE I.—*300 Non-tonsillectomised Cases.*

			Per cent.
Developed endocarditis	.. .. ..	.. 176 =	58·7
,, chorea	.. ..	.. 103 =	34·3
,, both endocarditis and chorea		.. 57 =	19·0
,, other rheumatic signs	..	.. 235 =	78·3
Deaths	.. ..	.. 17 =	5i7

In Table II. is set out information about the cases that appear to have had their tonsils removed in a satisfactory manner either before the onset or during the very early stages of the rheumatic disease.

TABLE II.—*50 Tonsillectomised Cases.*

		Per cent.
Developed endocarditis	29	= 58
,, chorea	16	= 32
,, both endocarditis and chorea	8	= 16
,, other rheumatic signs	40	= 80
Deaths	2	= 4

Over 60 cases have had to be excluded from the above tables either because the tonsils were incompletely removed or because the operation was carried out after endocarditis was established and the influence of the operation could not be fairly judged. The very variable behaviour of every case makes it very difficult to record in any simple way the complications and clinical course of rheumatism in the child. In the Metropolitan Asylums Board report of 1928–29 short case-notes of many of the patients here referred to are given, but this method is somewhat cumbersome, and it is hoped that the tables will be sufficient to indicate that tonsillectomy, even when carried out in a satisfactory manner during the early stages of the disease, does not appear to have any great influence on the behaviour of rheumatism and is no safeguard against either carditis or chorea.

References.

Boas, E. P., and Schwartz, S. P.: Amer. Heart Journal, 1927, ii., 375.
Lambert, Alex.: Amer. Jour. of Med. Science, 1920, lxxiv., 993.
Kerley, C. G.: Jour. Amer. Med. Assoc., Feb. 16th, 1929, p. 517.
McSweeney, C. J.: THE LANCET, 1928, i., 959.
Medical Research Council: Special Report Series No. 114, p. 40.
Miller, R.: Supplement to B.M.J., 1926, ii. Suppl., p. 16.
Poynton, F. J.: Brit. Med. Jour., 1925, ii., 788; and Medical Press, September, 1926.
Robey, W. H., and Freedman, L. M.: Boston Med. and Surg. Jour., 1927, cxcvi., 595.
Schichhold, P.: Münch Med. Woch., Feb. 8th, 1910.
Thomson, A. P.: Birmingham Med. Review, August, 1926, p. 225.
Vining, C. W.: Proc. of Bath Conference on Rheum. Dis., 1928, p. 68; and Brit. Med. Jour., 1929, i., 629.
Wilson, May, Lingg, C., and Croxford, G.: Amer. Heart Jour., 1929, iv., 197.

THE STATE OF THE PUBLIC HEALTH.[1]

THE Annual Report of the Chief Medical Officer of the Ministry of Health for 1928, of which a preliminary review was published in THE LANCET of August 31st (p. 480), is, as usual, packed with information set out in a way which cannot fail to interest.

Sir George Newman poses six questions to which every State and every local authority must seek the answer; the State or authority which knows the most economic and effective answer will excel. These questions are: How is an imperial race to be reared? How are children to be nurtured so as to grow up into healthy and productive adults? How are healthy men and women to retain their physical and mental health, and grow in grace, knowledge, and capacity? How are the sick and diseased to be treated in such a way as to enable them to return, healed as soon as possible, to the ranks of workers and breadwinners? How, in the last resort, is disease to be prevented? How are dysgenic forces (which are undermining racial health) to be defeated, and human existence controlled? To find the answer is, he says, among the supreme tasks of government in every country; it is a problem of permeating the whole art of government with the established knowledge of science and inspiring it with humanism, a biological process which demands all the faculties and powers of man's body and mind for its accomplishment. "Preventive medicine means the organisation of human nurture. Nothing is more certain than the fact that the physical advancement and health of mankind is dependent, not upon a 'doctor's stunt,' here, or a 'sanitary institution' there, but upon the whole social environment and evolution of the people." He lays down four basic principles as foundation for a national system of preventive medicine. First there must be ascertainment and accurate registration, for without statistics we cannot even begin to measure the value of methods or results. Secondly, there must be a standard of health and physiology, and we must understand the relation of man's whole environment to the normal physiology of his body, and to departures from its standards. Thirdly, we must have an ever-increasing knowledge of the nature, character, and incidence of disease, the social factors which modify it, and its mode of spread, treatment, and prevention. Fourthly and lastly, there must be national organisation. The proof of the validity of the medical ideal is essential to its wide adoption; its acceptance depends upon the assent of the people, its application calls for public money, and its administrtion for public representatives.

[1] Annual Report of the Chief Medical Officer of the Ministry of Health for 1928–29. H.M. Stationery Office. Pp. 295. 3*s*.

Maternal Welfare.

The year 1928 was marked by considerable increase of interest in the problems that concern mother and child, and the Ministry of Health is to be congratulated on the success of its efforts to awaken the profession and the general public to the need for a more complete and adequate maternity service. The maternal death-rate has shown no substantial reduction since 1911, and although this static position may be more apparent than real, it emphasises the need for continued effort. Puerperal sepsis accounted for 1184 of the 2920 maternal deaths, and this figure must be regarded as a certain understatement of the deaths due to puerperal infection. It seems to be generally conceded that every pregnant woman should have ante- and post-natal examination by a medical practitioner, the attendance of a qualified midwife during labour, and the services of a doctor if any abnormality arises. A scheme of this sort would, it is hoped, abolish the "handy woman," and secure cöoperation rather than competition between doctor and midwife. The number of antenatal clinics approved by the Ministry increased during the year, but their standard of efficiency unfortunately is not always as high as it should be. Obviously attendance at an unsatisfactory antenatal clinic may be a positive danger, and the Maternal Mortality Committee have prepared a memorandum setting forth the principles and organisation required to bring an antenatal centre to the minimum standard of adequacy. This memorandum, which was summarised in THE LANCET of August 10th, p. 295, is printed in the Report, and will, it is hoped, be studied carefully by all authorities.

There is still a shortage of maternity beds; at the end of April, 1929, there were 2480 beds recognised by the Ministry. The Report takes a conservative attitude towards the recommendation that every baby should be born in a hospital of some kind. While hoping that there will soon be enough beds to supply every woman who wants one, the Ministry feels that for a long time to come the great majority of births will take place in private houses, and that the improvement of domestic midwifery is therefore its first concern. Moreover, without an extremely high standard of treatment, and a lively appreciation of the risks of puerperal infection, the congregating of a number of parturient women in one place paves the way to an outbreak of sepsis, which could never occur if the patients were segregated in their own homes. The Report gives, as a warning, an account of some outbreaks of puerperal fever in maternity homes, and emphasises the importance of searching for unwitting carriers of hæmolytic streptococci in the nasopharynx. It is hoped that the reorganisation of space under the Local Government Act may allow for the formation of larger and better-equipped maternity units. Now that motor transport is available all over the country, one unit can serve a very large area, and small maternity homes can be linked administratively with the large centres. Although the training of medical students has greatly improved during the last decade, it is by no means universally satisfactory, and there is practically no provision for post-graduate work in midwifery. The Report urges obstetric specialists to pay special attention to this aspect of the problem.

A committee was appointed in the summer of 1928 to consider the training of midwives, and the conditions of their work. Their report will be published shortly.

The committee on maternal mortality, appointed at the same time, is a standing committee to survey the whole field of obstetric practice, and from time to time to make suggestions to the Ministry. It has three subcommittees—clinical, public health, and research. Its first duty was to advise on the investigation into maternal deaths, and two medical assessors were appointed for this purpose. The response made to the request for investigation has been very satisfactory; up to the end of last June English medical officers of health had sent in 282 reports for 1928, and 869 reports for 1929.

Infant and Child Welfare.

On April 1st, 1929, there were 2522 recognised infant welfare centres in England, an increase of 91 during the year. There are 4131 whole or part-time visitors. The new regulations making an approved certificate a condition of the Ministry's approval came into force on April 1st, 1928, and caused a certain amount of difficulty in filling vacancies. There are many more students training this year than last, but local authorities are urged to facilitate schemes for training, and to arrange attractive conditions for service. There are the same number of beds for infants as last year, and there are now 98 day-nurseries and 104 homes for unmarried mothers and their babies, 95 of which receive grants. The mothers stay about six months in the homes, which provide accommodation for 1480 women and 1340 babies. The Ministry also recognises 34 residential homes for orphaned or illegitimate babies. Arrangements have recently been made at Chailey for the reception of babies suffering from malnutrition and similar ailments; the results have been very satisfactory.

The Report remarks that the infant mortality-rate will not continue to fall unless more and more means of securing infant health are discovered and applied. The Health Committee of the League of Nations set up a committee to consider infant welfare, and under their ægis a year's investigation was made into stillbirths and neonatal deaths in selected districts in Germany, Austria, France, Holland, Norway, Italy, and England. Very much the same returns were obtained from all these areas. Everywhere the great majority of deaths fall into three groups: (1) stillbirths and neonatal deaths due to prematurity and obstetric trauma; (2) gastro-intestinal diseases; (3) respiratory diseases.

The second group is the most preventable, and can be reduced to a negligible factor in districts where care is taken. The first group accounts for about two-thirds of all infant deaths, and is not showing any appreciable diminution. Our means and methods of preventing respiratory disease are by no means adequate, and call urgently for improvement.

The time has undoubtedly arrived for a very special effort to discover and deal with the defects and diseases of children between one and five years of age. More facilities are needed, and more attempts should be made to persuade parents to take advantage of them. The most critical period is probably that of weaning and just after; the mother has neither time nor knowledge to see that the difficult process of transition from babyhood to childhood is mitigated. Frequent visits to a consultation centre are most desirable for the infant, but by no means essential for the older child, and what is needed is some scheme which will help the mother to make the best use of her own resources, and to supplement these resources when necessary. In 1924 an investigation into the health of pre-school children was initiated, with the help of medical officers of health and voluntary centres. A number of children in three groups have now been kept under observation for three years, and nearly 2000 case sheets are available for statistical investigation. The three groups were: (1) average unselected children attending a centre; (2) "catarrhal" children attending a centre; (3) two or more children in the same family. The results of an investigation at Guy's Hospital into the causes of catarrh are summarised. It was found that 1016 catarrhs were suffered by 370 children, and the greatest proportion (an average of 3·1 per child) occurred in the second year of life. The resistance during the first year is ascribed partly to breast-feeding but primarily to fresh air. The infant can be left out of doors most of the day, but the toddler needs constant supervision, and is often taken out only when the mother goes shopping. In the third and fourth years the children can be allowed out by themselves. The correlation between the amount of fresh air and the average number of catarrhs per child is very striking. Children who were grouped as having a good deal of fresh air showed an average of 1·82; those who had a moderate amount of 3·11; while those who had little air were small, pale, waxy babies, with soft limbs, protuberant abdomens and snuffling noses, or fretful toddlers with thick lips, narrow chests, poor muscles, bad appetites, and disturbed sleep, and showed an average of five colds per child.

The Insurance Medical Service.

The post-war years have formed a period of steady development of efficiency and growing mutual confidence. The Report points out once again that the "panel doctor"—sometimes criticised as though he were some strange genus—is only an ordinary general practitioner, who has chosen to devote part of his time to general practice among insured persons. The great majority of doctors in England and Wales are panel doctors, and the treatment they give their insured patients does not differ from that which they give to their private patients. The Report also explains how insurance practice can be carried out with less clerical work than is normally necessary in a well-conducted practice. The number of insured persons entitled to medical benefit in 1928 was 14,814,000, more than one-third of the total population. The number of insurance practitioners was 15,276, and the number of prescriptions dispensed by 9688 chemists was 54,455,557. Exclusive of administrative expenses, the cost of medical benefit was £9,073,080, of which about £2,241,780 were spent on medicines and appliances. The extraordinary rarity of serious complaints throughout such an immense service, which is run without any system of clinical inspection, is a striking testimony to the high standard of professional conduct which Sir George Newman believes to be "an outstanding feature of British general medical practice." During 1928, an important extension was made in the coöperation of the medical profession on the "disciplinary" side of the service. When a practitioner is adjudged by an Insurance Committee to have failed to fulfil his obligations, either party may appeal to the Ministry of Health. In considering these appeals, the Minister is now advised by a committee consisting of the Chief Medical Officer and two other medical officers of the Ministry, and three doctors selected from a panel nominated by the Insurance Acts Committee of the British Medical Association. Moreover, any officer who is appointed to hear an appeal has sitting with him a practitioner selected from this panel. During 1928, the practitioner was exonerated in most of the 299 cases of complaint investigated. Remuneration was withheld in 42 cases only, and no formal representations were made that a practitioner should no longer remain on the list. Remuneration was also withheld from eight practitioners who had failed to keep medical records, and from five who had failed to supply the regional medical officer with necessary information. It is hoped that the cost of prescribing may be reduced by the preparation of a single formulary for use throughout the country, and this formulary has now been prepared by a special subcommittee. Practitioners will also very soon be supplied with a quarterly statement of the principal statistics of his own prescribing, with a comparison of the cost per prescription per person with the average cost incurred by all the practitioners in the area.

There have been several conferences to consider the steady increase in the number of claims for benefit, and various changes in the certification rules are under discussion. It has been agreed that a common form of notice should be used for all patients who are referred to a regional medical officer, and that the source of reference should not be stated, so that patients will not know if the doctor has referred them as doubtful; that the certificates issued to doctors should be consecutively numbered, so that it is possible to ascertain the number of certificates issued by each practitioner; that statistics should be prepared of the number of patients referred to the regional medical officer by each practitioner, and of the proportion of them who consequently cease to draw benefit, and that any doctor who appears from these figures to be exercising insufficient care in certification should be approached in the matter, and that if his explanations appear unsatisfactory, the Minister should refer the matter to the panel committee for disciplinary action.

The attempt to provide post-graduate facilities met with indifferent success, and only 89 practitioners attended courses of instruction during the year. Additional efforts are being made to increase the number in 1929. More and more cases are being referred to the Regional Medical Staff, which now consists of 59 officers, eight additional deputy regional medical officers having been appointed.

By the National Health Insurance Act, 1928, two new benefits were provided: payment for medical or surgical advice or treatment outside the scope of any other benefit, and payment to approved charitable institutions for treatment outside the scope of ordinary benefit, both additions being under a special ad hoc scheme. The sum of £2,500,000 was allocated to dental benefit during 1928, and about £400,000 to ophthalmic benefit. The Regional Dental Service began its work in March, 1927, and 27,684 cases were referred to it during 1928. Two additional regional officers and 20 part-time referees were appointed.

NATIONAL VETERINARY MEDICAL ASSOCIATION.

ANNUAL MEETING AT AYR.

Dr. O. Charnock Bradley, Principal of the Royal (Dick) Veterinary College, Edinburgh, presided at the annual meeting of the Association held last week at Ayr, when delegates were present to the number of about 200, including representatives of the United States, Canada, Australia, New Zealand, and Japan. Dr. Bradley surveyed the great developments taking place in every phase of veterinary science and practice, especially the growth of animal research. In the seven years since he last presided over the Association, an Institute of Animal Pathology, under Prof. J. B. Buxton, had arisen at Cambridge, and an Animal Diseases Research Association in Scotland, with an Institute of its own. At the same time there had been a rapid and remarkable increase in the number of public appointments, the veterinary staff of the Ministry of Agriculture had been augmented, most important of all was the growth of an army of county and municipal veterinary officers The country was beginning to realise the importance of veterinary science in the protection of the health of the people. Dr. Bradley described the efforts to build up an adequate veterinary service in the colonies and dominions, where the supply was below the demand. The recommendations of Lord Lovat's committee were likely to have a profound effect on veterinary education generally. He expected that the report would induce more men of university standing to enter the veterinary profession. Uneasiness as to bovine tuberculosis was growing, and he thought the time had come to form a consensus of practical economic and academic opinion as a comprehensive basis for future action.

Carriers of Foot-and-Mouth Disease.

Mr. J. O. Powley, M.R.C.V.S., of the Ministry of Agriculture, made some striking suggestions about the sources of foot-and-mouth disease. In a recent outbreak investigated by the Ministry, lesions were found on the feet of rats. The Research Committee is pushing this point to a finish, but the viability of the virus and its easy destruction are two factors of difficulty. Feeding pigs, poultry, and cattle with crushed, imported marrow-bones has resulted in outbreaks, and presents another channel of inquiry. About 50 to 60 per cent. of the bone for making bone-meal came from South America. It was always fresh and, therefore, always dangerous. There had been reports of human beings suffering from this disease; but he knew of no steps taken to verify the diagnosis. Foot-and mouth disease is still full of unresolved problems; fortunately the incidence on human beings is small, and the "slaughter" method is practicable with animals. But something more scientific is wanted and expected.

Tuberculin Testing.

Prof. Buxton described the methods of applying the tuberculin test to herds, giving facts which, after all these years, are disconcerting. He considers that the double intradermal method gives almost 100 per cent. accuracy. The subcutaneous method is notoriously unreliable. Everyone must agree that the tuberculin itself should be standardised for animal testing as it is, under the Therapeutic Substances Regulations, for human application. Until this is done, reliable results can hardly be expected. The Medical Research Council has already surveyed the field. Obviously, too, the skill needed for carrying through the test is underestimated.

Mineral Requirements of Farm Animals.

Dr. J. B. Orr, director of the Rowett Institute for Research in Animal Nutrition, said that of the non-energy-yielding constituents, those required in largest amounts were calcium and phosphorus. They not only formed the main elements in the skeletal structures, but were present as essential components of every living cell. Pigs on a diet deficient in calcium developed symptoms resembling tetany in children, a condition in which the blood-calcium had been shown to be definitely below normal. The evidence which could be brought forward in support of the hypothesis that deficiencies of calcium and phosphorus in the food led to decreased resistance to certain diseases was much too meagre to enable them to draw any conclusions. It was sufficient, however, to stimulate further investigation. The bearing of diet on resistance to infectious disease was a research problem for human as well as for animal preventive medicine; but the most enlightening work had been done on farm animals. The field for observation was much wider in the animal world. The ideal combination for research would be team-work between the veterinary clinicians and the physiologists.

Prof. J. Russell Greig, of the Royal (Dick) College, said that the presence of calcium in the organs was of prime importance against toxins. Stiffness in race horses after the severe exercise of galloping was due to the calcium being rendered non-available. On recent evidence he had no hesitation in saying that calcium deficiency was the cause of milk-fever in cows, and he suggested that the heavy losses through sterility might be associated with the same cause.

Calcium and phosphorus metabolism are already occupying the energies of many investigators. It is pre-eminently a case for the collaboration Dr. Orr suggests. Given the adequacy or deficiency of calcium and phosphorus, the controlling factor is still to seek, just as in the case of the blood-sugar. But full advantage should and will be taken of the facilities available at institutes for animal research like the Rowett.

The next annual meeting of the Association will be held in London, before the opening of the International Veterinary Congress there, in August, 1930.

MEDICINE AND THE LAW.

Drugging the Truth out of Suspects.

A FEW days ago fresh reference appeared in an evening newspaper to the possibility of obtaining evidence in criminal trials by administering drugs to a prospective witness and thereby throwing him off his guard and enabling admissions to be extracted from him while he was at a disadvantage. This idea of applying to the detection of the criminal an experience acquired in obstetrical practice has already been discussed in THE LANCET more than once. In 1922[1] mention was made of a paper read by Dr. E. House, of Ferris, Texas, before the State Medical Association of Texas on the Use of Scopolamine in Criminology. An extraordinary attempt to turn this method to account was described in our pages a year ago when[2] "a heavy injection of hyoscine hydrobromide" was reported to have been administered to a suspected murderer in Hawaii. The Royal Commission (presided over by Lord Lee) on Police Powers and Procedure quoted our account of the Hawaii incident in its report last March in connexion with a discussion of so-called "Third Degree" methods of extracting evidence. The etymology of the expression "Third Degree" is a little obscure. According to an American authority the "First Degree" occurs when the officer of the law puts inquiries upon arrest, the "Second Degree" when the arrested person is taken to the place of confinement, and the "Third Degree" when that person has been taken into private quarters and there interrogated closely as to his movements or as to the bloodstains upon his clothing, &c. As was stated in our columns a year ago the system of extracting evidence with a hypodermic injection is so utterly alien to the British methods of police and criminal procedure that its adoption in this country is unthinkable. We have evolved an elaborate formula for warning an accused person that what he says in answers to police questions may be taken down in writing and used against him. This system of giving a "caution" is entirely inconsistent with any idea of catching a man off his guard. It has sometimes been suggested in criminal trials on behalf of the accused that the police have extracted some information from him by acting contrary to the spirit, if not also to the letter, of the prescribed procedure. Where such an abuse has occurred, there is no doubt that English juries will have seen to it that the interests of the accused do not suffer thereby. The Lee Commission was convinced that a criminal court does want to know what an accused person has said upon arrest or upon the charge being read over to him. The Commission sought to ensure that no such statement should be used at trial unless the accused had obviously been willing to make a statement and unless the statement was accurately recorded. The Commission recommended, therefore, that an accused person, expressing a wish to make a voluntary statement, should be cautioned (i.e., should be warned that he is not obliged to make any statement, but that, if he does, it may be given in evidence), should be offered writing materials, and should be left to write it without being overlooked, questioned, or prompted. If he declines to write the statement himself then—the Commission suggested—he should, as a new and additional safeguard, be required to write out in his own hand a request to the following effect:—

"I, A. B., having been cautioned that I am not bound to say anything, and that what I say will be given in evidence, wish to make a statement, which I have asked Sergeant C. D. to write down for me."

Such a request, it was recommended, should be signed by the accused person, who should add the time and date of its being written. His statement should then be taken down by the police officer in long-hand as nearly as possible in the actual words used, with a special precaution limiting the asking of questions by the police to remove ambiguities. Further, the accused should be given ample time to read and re-read his statement with a view to correction—ample time meaning several hours or even next day; and any prisoner who wishes to make a statement should, if he desires, be entitled to have his legal adviser present and to be supplied with a copy of what he has said.

These recommendations require no statutory confirmation; they merely set up a standard of fair play in administrative procedure; they do not greatly differ from the practice already operative in many of our police forces. The breadth and reasonableness of them show how impossible it is for our criminal methods to tolerate any idea of drugging the truth out of an accused person.

[1] See THE LANCET, 1922, ii., 1082, 1190.
[2] See THE LANCET, 1928, ii., 990.

BERLIN.

(FROM OUR OWN CORRESPONDENT.)

Influence of Caffeine on Fertility.

Prof. H. Stieve, of Halle University, writing to the *Medizinische Welt*, reports on experiments made by him on the influence of caffeine on the procreative capacity. Using rabbits of the Russian species he made three series of experiments; in one he gave caffeine to male rabbits and then mated them with female rabbits; in another group he gave caffeine to females only and not to their mates; and in the third he gave caffeine to female rabbits who had previously been impregnated by non-caffeinised male rabbits. In the first series a quantity of 0·025 g. for each kilogramme of body-weight had no influence on the sexual impulse even if given daily for a period of six months; but of 71 young rabbits born at the proper time 54 (76 per cent.) died within the first week. Male rabbits may, however, become accustomed to the caffeine, since among rabbits receiving 0·1 g. daily all but one out of 42 young remained alive. Female rabbits are more sensitive to the drug than male ones, since in the second series 72 per cent. of the young died or were born dead. In the third series, where the females were given caffeine during pregnancy, only 72 per cent. of the expected litter were born. Of the surviving male brood some showed early disappearance of the sexual impulse. Prof. Stieve concluded that caffeine has a toxic effect on the generative glands. In females dying from chronic caffeine poisoning degeneration of the ovaries was found, while in males the formation of semen was found to have ceased. As far as man is concerned such large quantities in relation to weight as given in these experiments are never consumed. A daily consumption of 4–5 large cups of strong coffee would be less than a tenth of the quantity which poisons rabbits. But as the human species is much more sensitive to caffeine than are rabbits, the author is of opinion that regular consumption of strong coffee has a deleterious effect on the generative capacity even if it does not prejudice the general health. He believes that a part of the undesired sterility observed in many civilised nations is due to the injury done to the generative glands by caffeine together with other toxic substances. Since mental strain is liable to prejudice the sexual impulse and since brain-workers are inclined to drink strong coffee, the cumulative effect may produce sterility.

Cost of Foodstuffs.

The Hamburg Statistical Office has made an interesting research into the cost of food of an average family of the lower middle classes. They distributed household account books to 300 Hamburg families of teachers, lower grade civil servants, employees, and skilled workmen who had agreed to record daily in the appropriate columns the money expended during a year on foodstuffs. It was recorded that the nutrient value of the food was on an average adequate.

The protein foods in the form of fish, meat, cheese, and bread amounted to roughly 74·6 per cent. of the total purchase, and must be regarded as lavish according to modern views. Fat was consumed per head in a quantity of 106 g. instead of the 60–70 g. which are adequate. Of vegetables only 404 g. were taken daily instead of the 500 g. which must be regarded as satisfactory, for the cost of vegetables is not small. Every family spent on an average 347 marks for 148 kg. meat, while only 39 kg. of fish were used at a cost of 38·5 marks. This is the more astonishing, as Hamburg is situated near the sea, and the cost of 10 g. of protein in form of fish is only 5·7 pfennigs, while meat of the same nutrient value would cost 11·7 pfennigs. The Hamburg Statistical Office states that by a larger consumption of fish the importation of meat from abroad would be considerably reduced.

Prophylaxis of Diphtheria.

Immunisation of children has been going on briskly in Berlin since 1926, when an epidemic of diphtheria occurred in a rather severe form. According to a report of the Municipal Health Office, more than 100,000 children have been protected. Two kinds of prophylactic were used, the Hoechst and the Behring antitoxin. The younger the children were the better was the injection endured. Apart from the local reaction, some children showed a general reaction which consisted in an increase of temperature for 2–3 days and sometimes a rash. Very few undesirable phenomena were recorded; a paresis of the arm of a girl was reported by her mother, but could not be detected some hours later and was thus probably of a hysterical character. A boy showed swelling of the axillary glands with a passing albuminuria, and another boy had a swelling of the cervical glands with a temperature of 40° C. and hæmorrhagic diarrhœa. All these children recovered and no permanent harm was done. The morbidity of the immunised children was only one-third of the general morbidity of diphtheria. The report insists on the need for two or three inoculations, with an interval of two or three weeks between each.

Birth Injuries.

Dr. Vogel, of Leningrad, has been investigating the importance of injuries received by infants during delivery. He has communicated a full statistical report to the *Monatsschrift für Geburtshülfe* on all the deliveries in the Leningrad Maternity Hospital from 1908 to 1927. In 34 per cent. of all the deaths of infants during delivery cerebral hæmorrhage was found at autopsy and hæmorrhage of the abdominal organs in 8 per cent. of the rest, so that hæmorrhage was found in 42 per cent. Injury was the cause of death in 50 per cent. of the still-births or premature births. Injuries are especially dangerous to fœtuses with lessened resistance; in breech presentations the proportion of mortality due to injury is still higher. The prophylaxis of injuries must consist in a reduction of operations, conservative treatment being in the interest of the child as well as of the mother. The author concludes from his investigations that delivery lasting even as long as 24–48 hours gives better chances of survival than operations.

Abuse of Medical Publications.

The Syndicate of the German Medical Press utters a warning against the indiscriminate recommendation of new drugs and compounds. The committee have long ago taken measures against that nuisance so that their columns are now open only to reports founded on personal experience. Certain publishers, however, not belonging to the Syndicate, find means of recommending drugs and compounds to the profession in an unfair way. A publishing firm, for example, advertises a filing system where certain drugs are inserted with indications for their use if the producer pays a sum varying from 200 marks upwards. Another firm publishes an annual for patent medicines which, according to the prospectus, is sent free of charge to every German medical man. A medical man who runs a risk of prosecution is the editor of a therapeutic manual who sends circular letters to the pharmaceutical factories asking them whether they are willing to have their products mentioned in the manual and if so if they are willing to pay for an insertion which will not be in the form of an advertisement. The medical profession is warned against such insidious advertisement.

Accident Insurance of Medical Staff.

The recent amendment of the State Accident Insurance Laws extends the clauses of that law to the staffs of hospitals, clinics, medical laboratories, and to every person employed by a medical man as assistant (qualified or otherwise), attendant, or servant. Every medical man employing such persons is regarded as an employer under the Act and must have his personnel registered for insurance purposes. Hospitals and the medical profession form a State insurance body after the pattern of the long-existing industrial employers' associations, which have to treat and to indemnify the injured. The contributions will be low and will be collected from the individual member of the profession by the medical chamber together with the other contributions payable to the chamber.

AUSTRALIA.

(FROM OUR OWN CORRESPONDENT.)

Dr. Colin Mackenzie's Knighthood.

THE conferment of a knighthood on Dr. Colin Mackenzie has been accorded the whole-hearted approval of medical and scientific circles in Australia. Sir Colin Mackenzie has devoted the greater part of his life to an intensive study of the anatomy of the unique fauna of Australia, especially the marsupials. The anatomical structure of these mammalian curiosities presents an unequalled but diminishing opportunity for studying human embryology from the functional standpoint. Work of practical value has already been done on uterine support; the problem of the double uterus; the anatomical relationships of the ureter and genital ducts; the comparative anatomy of the mandible, the central nervous system, the colon, the great omentum, lesser sac, and appendix vermiformis. The marsupials offer an excellent field for the study of postural changes. After a brilliant career as an orthopædic surgeon, Sir Colin retired from practice in 1924 to give the whole of his time to the study of indigenous animals. He founded the Australian Institute of Anatomical Research, which controls a large reservation of native fauna in the mountainous district of Healesville, near Melbourne. His own unique collection of macroscopic and microscopic preparations—for which he recently refused an offer of £100,000—has been presented to the Commonwealth. Since the foundation of the national capital at Canberra, plans have been prepared for an Australian Institute of Anatomy, to be built at a cost of £110,000, on a site of eight acres. Associated with this institute will be a reservation of 80 acres, occupying a peninsula of the Molongolo River, where native fauna can be studied in the natural state. Canberra is destined to become the anatomical centre of the Pacific, and, from the point of view of specimens, the Australian Institute will rank second only to the Hunterian Museum of the Royal College of Surgeons of England. It is fitting that Sir Colin has now been appointed its director.

Medical Education in Victoria.

Prof. R. J. A. Berry, Dean of the Faculty of Medicine at the University of Melbourne, in a report recently submitted to the Premier of Victoria, critisises the conditions of medical education at the Melbourne University. He urges the necessity for the pre-medical general cultural education of students, for a more careful selection of candidates for the

medical course, involving an entrance examination, and he considers that there is grave danger of immaturity under present conditions. Prof. Berry disapproves of the administration of the University Council which he describes as a "non-medical body of elderly men." He objects to their reviewing proposals by authorities on medical education, and he asks for increased powers of spending the money allotted to the faculty of medicine. The Council have responded to his criticism by expressing sympathy with his proposals for reform.

New South Wales Hospital Bill.

The problem of financing the hospitals of New South Wales has been the despair of their managing boards and has over-taxed the resources of the Treasury. In an endeavour to place the hospitals on a sounder basis, a Hospitals Bill has been introduced to the State Parliament. Consideration was given to the proposal to conduct a Government lottery for the benefit of the hospitals (as is already being done in Queensland) but this idea was shelved. The introduction of an amusement tax for hospital purposes was considered impracticable. The imposition of a hospitals tax was not favoured by the State Parliament. In the first place, taxation is already heavy enough, and secondly, there was a fear that nationalisation would dry up voluntary contributions and lead to a more extensive use of the hospitals by those who could afford to pay for private treatment. It is now proposed to divide the State into hospital districts and to constitute a hospitals board consisting of a chairman, two medical men, two representatives of metropolitan and country interests, and a woman member. New South Wales has been fortunate in securing the services of Mr. R. J. Love, until recently the secretary of the Victorian Charities Board, who has just returned from a study of hospitals of Great Britain and America. The board will coördinate the activities of public hospitals with a view to greater efficiency and economy in operation, will allot the subsidies in proportion to the size and needs of the hospitals, and will exercise stricter control over payments by patients who can afford them. Schemes of industrial contributions will be encouraged.

In the discussion which the Bill evoked in Parliament some interesting figures were brought to light. In 1906 there were 20 hospitals in the metropolitan area and 114 in the country. In 1926 that number had grown to 27 in the metropolitan area and 134 in the country. The number of in-patients per year for those years had been 34,800 and 116,636 respectively. The population had increased by 56 per cent., but the number of in-patients had increased by 215 per cent. The advent of motor traffic caused a considerable increase of serious cases; in many hospitals from 10 to 12 per cent. of the patients are there as a result of motor accidents, and they remain in hospital for long periods. More than 60 per cent. of the expenditure at the Sydney Hospital is on account of wages. New South Wales is making an attempt to grapple with a problem which is increasing the world over in magnitude and complexity.

ST. THOMAS'S HOSPITAL.—In his annual report Sir Arthur Stanley, the treasurer, states that, after long and careful consideration, a scheme has been evolved for the erection of an out-patient department on the site opposite the hospital purchased ten years ago. This scheme, he says, "will make St. Thomas's the finest hospital in Europe." He said that the plan which, in its entirety, includes the new medical school, had met with the whole-hearted support of the medical and surgical officers. The accommodation for paying patients in St. Thomas's Home—20 beds for each sex—is inadequate. The medical and surgical staff have represented that 80 or 100 beds would not be too many, and it is hoped that in the near future it may be possible to build such a home on the Paris-street site. Of the 593 beds in the hospital 569 were occupied on the average. There were 11,674 in-patients who stayed 18 days and cost £11 6*s.* 1¼*d.* each. There were just under 100,000 new out-patients who cost 12*s.* 6*d.* each. The expenditure was £188,590, which exceeded the income by £3616.

Public Health Services.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

THE following are some 1928 statistics of three county borough health resorts, a borough, and a cathedral city:—

Name of district and estimated (R.-G.) population.	Birth-rate.	Death-rates per 1000 of the population.					Death-rates per 1000 births.		
		All causes.	Tuberculosis.	Cancer.	Respiratory diseases with influenza.	Heart disease.	Infant and neonatal mortality.	Young child (1–5 yr.) mortality.	Maternal mortality from childbirth.
Brighton C.B. (148,800)	13·5	12·9	0·91	1·09	1·4	2·7	51/27	39	2·5
Eastbourne C.B. (58,500)	12·4	11·5	0·99	1·74	1·0	2·1	43/30	15	1·4
Hastings C.B. (62,600)	12·0	15·0*	0·93	2·00	2·3	3·2	51/24	23	4·0
Swindon B. (61,110)	15·6	9·9	0·79	1·49	1·2	1·7	36/15	22	4·4
Worcester C. (52,650)	14·8	13·6	1·00	1·78	1·3	2·7	59/28	66	0·0

C. = City. C.B. = County Borough. B. = Borough.
* Standardised rate = 10·8.

Brighton.

Dr. Duncan Forbes reports that the borough was extended during the year to include Rottingdean, Ovingdean, a large part of Patcham, and a small part of Falmer. In the added areas many bungalows had been already erected with small regard to either sanitary conveniences or town-planning. The borough council have continued the arrangement made by the county council for the subsidisation of the two nurse-midwives for Rottingdean and Patcham, and with the aid of the residents a new district nursing association has been formed for Moulsecoomb. Dr. Forbes deplores the fact that children die unnecessarily from diphtheria because the family doctor is called in too late and the giving of antitoxin is delayed by waiting for the result of the bacterial examination. He pertinently asks why the examination of swabs in acute cases with exudate in children should not be discontinued. The insurance committee suggests that a rheumatic clinic should be established in Brighton.

There are still bad cases of overcrowding unrelieved. During 1928 the corporation completed 126 houses on the North Moulsecoomb estate and 60 in Whitehawk Valley. All the last-named houses are now occupied by tenants from bad property or from houses which were later occupied by tenants from bad property. The policy of the health committee was to rehouse at Whitehawk tenants from a condemned area, including some, which were not desirable, in the hope that given a chance they would improve with healthy surroundings. In 1927 a loan of £4000 was approved for the reconditioning of unsatisfactory houses purchased by the corporation. Up to May, 1929, about £3400 of this amount was spent over the purchase and reconditioning of 23 houses. On Jan. 1st, 1928, the Carlton Hill area was represented covering 3 acres and with a population of 775 adults and 223 children under 10. Brighton's difficulty is that the displaced tenants from the congested areas in the centre, who ought to be housed in the suburbs, cannot pay the increased rents and the bus fares in and out, and many of them are dirty and unsatisfactory tenants. The present scarcity of working-class houses makes a "move-round" difficult. The

housing subcommittee desires to have only good tenants, and in any case the corporation could hardly rehouse bad tenants while there are good tenants living in conditions of overcrowding. The unfit houses cannot be closed and the landlords will not renovate them. Dr. Forbes puts forward as suggested remedies: that the council should consider the relief of overcrowding in sanitary as well as insanitary property in spite of the fact that the tenants cannot pay an economic rent; that a more elastic reconditioning scheme should be introduced; and that private citizens might be encouraged to form a voluntary association for the purchase and reconditioning of poor property.

During 1928 108 samples of milk were examined for tubercle and nine gave a positive result. In three cases cows were found and dealt with under the Order, but in six cases no infective cow was found.

Eastbourne.

Dr. W. G. Willoughby states that 56 subsidised houses were erected during the year, of which 46 were municipal. At the end of the year there were 986 applicants for houses, of whom 81 had a whole house, 127 were newcomers, and 130 lived outside the borough. Of the remaining 648 applicants, 115 had no child, 270 one child only, and 141 had at least three rooms each. Among the remaining 122 and the 270 with one child, there were probably about 200 instances where the council could have good tenants and remove uncomfortable existing conditions. Dr. Willoughby says that it is obviously necessary for the municipality to continue to build houses. At the close of the year only 15 of the huts were still occupied and these 15 tenants were to be provided with houses during the first quarter of 1929. The Municipal Maternity Home (14 beds) admitted 239 mothers for confinement, the total births in the borough being 726. The municipal midwife lives in the Home and attended 103 outside confinements as compared with 86 in the previous year. The antenatal work of the Home is an important development. After four years of comparative freedom from diphtheria there were 120 cases notified in 1928 with five deaths. The average notifications for the previous ten years were about 40.

Eastbourne's sunshine record (1991·8 hours) was the third highest in the United Kingdom (excluding the Channel and Scilly Islands); and the rainfall was 34·73 inches.

Hastings.

Dr. G. R. Bruce states that the chief item of interest among infectious diseases was the increased prevalence of diphtheria during the second half of the year. The peak of the incidence was in the fourth week of July with 21 notifications. The schools were not specially affected and most of the cases occurred in the populous central districts where visitors congregated. Throat swabbing indicated that the germ was widely distributed among contacts. The type of the disease was mild, there being only 2 deaths out of 133 notified cases. The orthopædic clinic at the Royal East Sussex Hospital, fully equipped and up to date in every way, was opened early in the year. At the end of the year there were 55 cases under treatment, 28 sent by the school medical, 19 by the maternity and child welfare, and 8 by the tuberculosis departments respectively. The chain of treatment appears to be complete, says Dr. Bruce, but one weak link is the difficulty in making parents understand the necessity for prolonged treatment and persistence in the exercises at home.

No subsidy houses were erected during the year and there are no municipal houses now in course of erection, although Dr. Bruce points out that there is still an unsatisfied demand for houses from families living in overcrowded rooms, basements, and small unsatisfactory houses, a considerable number of whom could not pay the rent of a council house. The first open-air school in Hastings was opened by Lord Eustace Percy on June 11th on a site previously lent by Miss Rance. The accommodation is for 25 delicate children from 5 to 9 years of age, and the education committee are considering the establishment of another similar school for the St. Leonards end of the borough. The sunshine record of Hastings was 1983 hours.

Swindon.

Dr. Dunstan Brewer reports that the borough was extended on Oct. 1st and that the Hurst municipal housing estate was included. The inhabitants of the area added had always attended the Swindon clinics and used the isolation hospital. The duties of the old Swindon and district hospital board have now been assumed by the town council and on Dec. 1st the borough took over the training school and extern midwifery department, which used to be run by the Wilts Nursing Association. The vast majority of Swindonians are reasonably comfortably housed. There are only four inhabitants per house, and if every unsatisfactory house in Swindon were swept away the population could be housed in the remainder without any overcrowding if the housing were arranged on a completely communistic basis. In practice, however, there is some overcrowding owing to the lack of lodgings for persons with families.

The great feature of the Swindon child welfare system is the continuous clinic at Eastcott Hill, where advice can be obtained every day and at all times. Ninety per cent. of the cases brought are false alarms, but the 10 per cent. represents life-saving. As an example of the value of this work, Dr. Brewer cites intussusception, which so soon becomes desperate. All stillbirths, of which there were 31 among Swindon residents, and all deaths of children under the age of 17, of which there were 66, are made the subject of investigation. This scrutiny of deaths of children has now been carried out for eight years and indicates that the mortality of childhood is now chiefly caused by measles and whooping-cough and their sequelæ. Full details of this investigation are included in the report. Dr. Brewer attributes the decrease in the neonatal deaths to antenatal supervision. The births in Swindon numbered 910, and there were 400 mothers in attendance at the antenatal clinic. In addition to the four deaths of mothers attributed by the Registrar-General to childbirth (making a rate of 4·4), there were two further deaths in connexion with pregnancy, one being from influenzal pneumonia and miscarriage and the other from gangrenous appendix. Most of the cases of ophthalmia neonatorum are treated at the municipal clinics and they are divided by Dr. Brewer into four classes:—

1. Gonococcus ophthalmia of two types, one developing within 72 hours and the other about 10 or 11 days after birth.

2. Blocking of the canaliculus. The discharge, in this case sterile, clears up after a small pellet has been pressed out of the lacrymal sac.

3. Severe ophthalmia due to the pneumococcus and other organisms. This type is indistinguishable from the gonococcal except that the cornea remains intact.

4. The fourth class includes cases associated with various micro-organisms.

Dr. Brewer gives a list of 136 cases of such ophthalmias and the organisms found during the last few years, of which 52 were due to the gonococcus. The report includes an interesting review of the epidemiology of the year. Dr. Brewer inclines to the view that tuberculosis is subject to the same general laws as are other parasitic reactions. He reiterates the view that pneumonia is of more consequence to the public health than any other factor. "If we know accurately what pneumonia is doing, we can tell the health of the community and forecast what is about to happen to it. Pneumonia, when implanted upon other infections or upon chronic disease, is the prime killer of man. From the numbers, but still more from the

types, of pneumonia in Gorse Hill Hospital at any given time the health of Swindon for the immediate future can be determined with surprising accuracy."

Swindon was attacked by small-pox in 1928 having been free from this disease since 1923. In July a Swindon boy returned from South Wales suffering from an acute illness. A few spots developed and his four sisters became ill in turn, but it was not until Sept. 30th that the nature of the disease was recognised. The outbreak was divided into two periods, up to January, 1929, and from March, 1929, onwards. There was a connecting link between the two periods and the report of the whole outbreak is a matter for the next annual report. The workers in Wills' tobacco factory, who were protected by vaccination early in the epidemic, escaped entirely. The day of highest infectivity appeared to be the day before the spots appeared. Scarlet fever, Dr. Brewer points out, is at the present moment the least important of all human infections, but under local circumstances has to be isolated in hospital. An epidemic arose during the middle of the year and the only way of meeting it was to shorten the stay in hospital. About 90 per cent. (numbering 340) of the cases were treated in hospital. There were no deaths and few complications. Very few cases were detained in hospital more than 28 days and many were discharged in a shorter period than this. Nevertheless, the rate for "return" cases was lower than ever before in Swindon.

There were ten deaths from diabetes in 1928. Dr. Brewer thinks this disease is increasing, that it is becoming more a disease of females than of males, and that its incidence in childhood is increasing enormously, at all events, in Swindon.

Worcester.

Dr. Mabyn Read records an extensive outbreak of measles during the first four months of the year. There were more than 1200 elementary school-children attacked, of whom 751 were in the infants' departments. Of the 36 deaths there were two at the age-period 5 to 10, whilst the remainder occurred at the age-period under 5. The high death-rate at the 1 to 5 age-period shown in the above table was largely due to the epidemic, seeing that 27 of the 52 deaths at the 1 to 5 age-period were attributed to measles. There was no death due to childbirth during the year, and during the ten years 1918–27 there were 9002 births registered with a maternal death-rate of 2·11.

There is still urgent need for the building of more houses; 125 cases of gross overcrowding were met with and there were nearly 500 applicants for new houses listed at the end of the year. In two instances, involving 16 houses, the Housing (Rural Workers) Act, 1926, was utilised, the total grants by the local authority amounting to £599 6*s.* 8*d.* During January the Severn was in flood and the water very turbid. The water on the filter beds was frozen and the number of micro-organisms in the filtered water increased, but at no time was there more than one *B. coli* per 100 c.cm. Excepting in January *B. coli* was not found in 100 c.cm. The water in the pure water tank was treated with chlorine from Oct. 13th onwards with excellent results, which continued during February, 1929, when thick ice formed on the filter beds and had to be removed day by day.

Dr. Read records a careful effort to discover the origin of a tuberculous milk which failed. He and the veterinary surgeon took a sample of the mixed milk of 21 cows at a city cowshed, which proved to be tuberculous. The veterinary surgeon again visited the cowshed and took samples from two suspicious cows. Both were reported negative. The intradermal test was applied to all the cows and samples were taken from the six which reacted and again the results were negative. Finally the 21 cows were divided into seven groups and the seven samples so obtained were again certified to be free from tubercle bacilli.

SCHOOL MEDICAL SERVICE.

—	No. on roll.	Aver. E.S. attendance.	Routine inspections.	Special exams. and reinspections.	Percentage defects.
Gloucestershire	Not stated		13,119	7637	12·5
Nottinghamshire	53,164	46,323	16,900	22,480	27·24

E.S. = Elementary school.

Gloucestershire.

THE Gloucestershire Authority has no special schools of its own but some attempt is made to obtain accommodation in institutions belonging to others. All the completely blind and deaf children are now provided for, and Dr. J. Middleton Martin says that the committee is providing in its estimates for the education of one or two cripple children in a special school outside the county. At present there are 421 cripple children still in elementary schools. Treatment is undertaken at hospitals widely separate—for example, at Bath, Bristol, Cheltenham, Gloucester, Stroud, Stratford-on-Avon, and Chepstow. The committee has, however, established out-stations in cottage hospitals, nurses' homes, and special buildings. In 1920 it was thought that 51 out-stations would be needed, but since that date transport facilities have greatly increased so that the number required will probably be smaller. In the next three years 12 new out-stations will be established. Orthopædic cases are at present inspected by the orthopædic surgeon at the Cheltenham Hospital and at seven out-stations, and they are kept under supervision by the surgeon and by the orthopædic nurses who attend the out-stations weekly and also see as many cases as possible in their homes. Efforts are being made to interest the district nurses, who are also the school nurses, in this work, and it is hoped that they will be able to give increasing assistance in the supervision of remedial exercises and the care of appliances. There is a great need for proper education under special medical supervision and the difficulties in the way of providing it should not be insuperable. It is thought that some one person will be willing to help in the training of each cripple. It seems that the nurses who act as health visitors, school and district nurses have many duties to perform. Dr. Martin answers the objection that the district work must make it impossible for them to keep regular appointments at the schools by the statement that they have only defaulted on 15 occasions. The arrangement must improve coördination and prevent monotony, but it demands a staff fully adequate both in quality and in numbers. A sign of the efficient work done by the nurses is the distinct fall in percentage (from 16·3 in 1916 to 7·2 in 1928) of children infected with pediculi in their heads, the improvement being far more noticeable in the rural than in the urban districts. The fall is also much more marked in the older girls than in the entrants, which suggests that public opinion is having much influence in the schools but as yet little in the homes. The dental work in the past has been limited in scope; with an additional dentist and dental nurse considerable extension will be possible. An encouraging feature of progress is the rise in acceptances of dental treatment from 54 per cent. in 1922 to 74 per cent. in 1927–28.

In spite of the pressure of routine medical work it has been found possible to devote a little time to the anthropometric inquiry instituted by the Board of Education. The number of children examined was small, but the results indicate that the Gloucestershire children do not depart significantly from the average in height and weight for the whole country. Separate records kept for the children of the Forest of Dean show that they are slightly shorter than the others, the difference being possibly due to racial characters.

A special inquiry has been made into rheumatic heart disease in coöperation with adjacent counties. The research includes detailed information of the history and environment of the children, but it will be some time before a considered statement can be prepared. Preliminary examination of the records indicates a steady fall from 1921 onwards in the proportion of children affected when beginning school. Dr. Martin's general comment on the progress of school medicine in his area is that "useful as is the work already undertaken there is scope for development in various directions. Thus more centres are required for surgical examinations and intermediate treatment, especially in the southern part of the county, and provision for education simultaneously with treatment for children who cannot attend an elementary school." This is a very modest statement of the needs of the area. It is evident that good use is being made of the facilities and personnel available but that these need considerable extension.

Nottinghamshire.

Owing to the sudden death of Dr. T. E. Holmes, who "saw the School Medical Service grow from its infancy of small beginnings to its coming of age," the duty of presenting the twenty-first annual report has devolved upon Dr. A. C. Tibbits. He notes that two fundamental deficiencies mentioned in last year's report—the failure of many children to obtain spectacles and to accept dental treatment—are being dealt with on the principle of "spending more in order to waste less." Spectacles are now supplied without prepayment on the parent undertaking to repay by instalments, and expenditure is reduced by the fact that measuring for frames is done by the oculists themselves at the time of refraction. The result has been highly satisfactory, 65 per cent. of the children examined for glasses having obtained them this year, compared with 45 per cent. in 1927. Dental treatment is now given without the payment of the shilling fee when this is necessary, and much propaganda, including the display of a film, has been carried on; by these means 48 per cent. of those needing treatment have received it this year, compared with 35 per cent. in 1927. The staff of doctors and of nurses has been increased. Dr. Tibbits specifically mentions the need for accommodation for epileptics. There are no open-air schools in the county, though the number of delicate children suitable for open-air schools is given as 1393.

MENTAL HOSPITAL REPORTS.

Essex and Colchester Mental Hospitals at *Brentwood and Severalls* had, on Dec. 31st, 1928, respectively, 1745 and 1782 patients on their books. The increase at Severalls was chiefly due to transfers from Brentwood. The recovery-rate at Brentwood was 31·78 per cent. and the death-rate 8·85 per cent. Of the 94 men and 132 women discharged during the year, 172 were granted a preliminary period of trial. There was an outbreak of colitis in the spring affecting 44 women, but energetic measures cut short the epidemic, and there was only one death. Otherwise the general health was good. General paralytics are being treated by malaria with some success. A whole-time pathologist has been appointed (to serve the two hospitals), and the equipment of the laboratory is nearing completion. A new nurses' home is being erected, and plans have been prepared for a new laundry and boiler house. The hospital is being wired, and it is hoped that by the end of this year it will be supplied with electricity. During the summer 162 patients enjoyed all-day excursions to Thorpe Bay. During the year the farm and garden gave a good yield. Parole is largely granted; 434 patients are free within the grounds, and 59 outside the estate. A number of the younger female patients are taught hockey under the enthusiastic guidance of the matron, and some of them have shown a distinct aptitude for the game. Sixty-nine attendants and 38 nurses hold their R.M.P.A. certificate.

The recovery-rate at Severalls was 20·3 per cent. and the death-rate 8·1 per cent. An epidemic of typhoid during the summer attacked debilitated patients who were on a mince diet. The outbreak was believed to be due to an infection of the mince, but how this took place could not be shown. Early in the New Year a somewhat unusual outbreak of colitis occurred in one female ward, but there were remarkably few cases of influenza. Organised occupation rooms are now established for handicraft work, and evening classes are held in some of the wards. Regular gymnasium classes are held for both male and female patients, and to them the Medical Superintendent attributes the great diminution in outbreaks of violence and destructiveness. A new wing has been opened at the female hospital villa, and acute cases can now be segregated; a similar wing is badly needed on the male side. An ultra-violet ray treatment room has been equpiped, and a new laboratory is to be built. Plans have been passed for a new wing on the nurses' home and an addition to the workers' villa. Fresh verandahs have been added during the year. Eighty-eight attendants and 30 nurses hold the R.M.P.A. certificate and five nurses have a general hospital training.

Hertfordshire County Mental Hospital at *Hill End, St. Albans*, had 1103 patients in its two blocks at Hill End and Arlesley on Dec. 31st, 1928. The recovery-rate was 30·4 per cent., an increase on the two preceding years. The death-rate was 7·19 per cent., including 11 deaths from tuberculosis and four from general paralysis. There is an urgent need for better accommodation. A number of men have been transferred to the Three Counties Hospital, and most of those remaining are sick, infirm, violent, epileptic, or of troublesome or defective habits. The congestion on the female side was only temporarily relieved by the completion of the new nurses' home. During the year 11 cases of dysentery, two of paratyphoid, and three of diphtheria occurred. Most of the cases were on the female side, where the overcrowding is most acute. General paralytics have been treated with tryparsamide, and suitable cases are, in future, to be inoculated with malaria. A physical drill class for male patients has been taken up with enthusiasm, and classes for raffia work and mat-making have been started in two wards. At the end of last year a canteen was opened, where patients can purchase goods by tallies. This has resulted in an increase in the amount of work done by the patients, especially in the sewing-rooms. One ward on each side is administered on the open-door principle, but only 16 patients are on full parole, and another 30 on parole within the grounds. A good deal of work has been done in the pathological laboratory, which is now well equipped. Two male and two female nurses obtained their R.M.P.A. certificate during the year, but no nurses sat for the State examinations. A mental deficiency institution is to be erected on a site in the Cell Barnes Estate, and plans are being prepared for an additional block at Hill End to accommodate 400 patients.

Cumberland and Westmorland Mental Hospital had 875 patients in residence at the end of last year. There is considerable difference between the day and night accommodation, and on the male side the hospital is overcrowded by day. The recovery-rate was 23·6 per cent. and the death-rate 7·7 per cent. The general health was good, and there was no epidemic except influenza, but the tuberculosis rate was high; 11 patients died of phthisis. All the patients discharged as recovered were allowed a preliminary period of trial. The number on parole is being gradually increased, as is also the privilege of going out for a day with nurses or friends. The chief need of the building is an up-to-date admission block for recoverable cases. Thirteen attendants and seven nurses are certificated or registered. Rather more enthusiasm for study is being shown, but there is still room for improvement.

Monmouthshire Mental Hospital at *Abergavenny* had 1209 patients on its books at the end of last year; this is one of the few mental hospitals in which male

patients outnumber female. The recovery-rate was 21·7 per cent., a figure which is much below the average for this institution, and which is attributable to the unfavourable type of admissions during the year. The death-rate was 5·2 per cent., the same as last year, and the lowest on record here. There was one case of enteric fever, a few cases of colitis, and a few of tuberculosis, but the general health was very good. The visiting surgeon was called in nine times and performed ten operations. The dentist visits weekly. All the patients are encouraged to occupy themselves in some useful way. Parole beyond the estate is given to 36 men and to 80 men and 21 women within the grounds. One ward on either side and the outlying houses and cottages are administered on the open-door principle. The laboratory is quite well equipped, and the visiting commissioners suggest the appointment of a trained laboratory assistant. They comment on the fact that there is no provision for ultra-violet ray treatment, or for cinema entertainment, and express doubt about the milk-supply. During the year 12 nurses passed their final examination.

Carmarthen, Cardigan and Pembroke Joint Counties Mental Hospital at *Carmarthen* had 651 patients on March 31st, 1929, an excess of 67 on the estimated bed space. The recovery-rate was 31·66 per cent. and the death-rate 9·14 per cent. The general health was not very satisfactory. There were 34 cases of influenza, 12 of diarrhœa, eight of tuberculosis, five of bacillary dysentery, and three of typhoid. The dentist attended weekly and treated 156 patients. The hospital is still without electric current, but the new drainage scheme and water-supply has been completed, and a new hot and cold water-supply is nearly finished. Other sanitary improvements at the farm have been effected. The dietary has been improved; butter is given in preference to margarine, but condensed milk is still used in tea and coffee. The visiting commissioner suggests the appointment of a laboratory assistant in order to bring the laboratory into activity. Great interest is taken in wireless, but more could be done to increase the patients' interest if the hospital had a cinematograph and a large motor conveyance. The farm accounts showed a loss of £117, but the profit on the garden was £218. Nine out of 11 candidates were successful in the preliminary examination for the R.M.P.A.

Glamorgan County Mental Hospital at *Bridgend* had 2032 patients on the registers at the end of 1928, an increase of 99 on the previous year, which has caused overcrowding. Fewer cases of general paralysis were admitted, but there were more chronic and congenital cases, and the prognosis was unfavourable in 65 per cent. The recovery-rate therefore dropped from 31·1 to 21·1 per cent. The death-rate of 7·8 per cent. is the lowest since 1879. Cause of death was verified by autopsy in 61·3 per cent. of cases. General health was good, except for 71 cases of influenza and three of dysentery. The visiting surgeon performed three operations and the visiting dentist 914 extractions. Although a room is set aside as a laboratory both at Angelton and at Parc Gwyllt, the commissioners do not consider that either of these rooms comply with the essentials of a laboratory. They stress the urgency of putting the laboratory in order and of appointing a laboratory assistant. Butter has been substituted for margarine, and tinned meat is now only used in emergency, but the commissioners think that more fruit and salads might be given. Cinema entertainments are held at both branches. Ten attendants and 15 nurses obtained their certificates; 57 per cent. of the men and 25 per cent. of the women are now certificated.

The Report of *Down County Mental Hospital, Downpatrick*, is illustrated by a number of photographs of the institution. There were 766 patients on the books on Dec. 31st, 1928. The recovery-rate was 36·9 per cent., a reduction on the previous year due to the very unfavourable character of the admissions. The death rate was 5.9 per cent., and autopsies were held on 21 of the 45 cases. The hospital is without electric current, which deprives the patients of several modern methods of treatment and enetrtainment. Over 100 men go outside the grounds daily, and 76 women are taken out once a week. The farm returned a profit as well as providing valuable occupation for the patients. There is no occupational therapy, but the Medical Superintendent records the impression made on him by a visit to the Dutch mental hospitals, where he found practically every patient employed. Fifty members of the staff hold the R.M.P.A. certificate, 12 having passed their final examinations during 1928. The medical staff are assisted by a visiting dentist and consultant physician, surgeon, and ophthalmologist.

Mental Defectives.

The Report of *Royal Eastern Counties Institution for the Mentally Defective* at *Colchester* is, as usual, abundantly illustrated by photographs of happy inmates at work and play. The Medical Superintendent makes the need for research the key-note of his report, and remarks how little foundation of proved fact there is on which to build theories of mental deficiency. The Littleton House School for mentally defective boys at Cambridge is to be attached to the Colchester Institution as a school branch. It is hoped that this will increase facilities for research. The Colchester Institution is to pay a rent to the trustees of the school, and the whole of the income accruing to the Trust is to be devoted to research. The particular type of research to be followed at any time is to be decided by a board of governors appointed by such bodies as the University of Cambridge, the Medical Research Council, the Board of Control, and the Board of Education. The very enlightened terms of this Trust are largely due to the owner of the property in which Littleton House is situated—Miss Ruth Darwin of the Board of Control.

Commenting on the advantage of sending out patients on licence, the Medical Superintendent quotes two cases of severe illness among girls living with foster-parents. Had they not been on licence, it would have been impossible to act with the promptitude necessary to save their lives. During 1928, 50 cases went out for the first time or on further trial, bringing the total to 118. Of these, two died and 23 had to return to the institution; 22 were working for wages in the care of friends, 14 were in living-in service, and 32 working at home or with foster-parents. Girls in service always spend their holidays at the seaside branch of the institution. While the year's work has been excellent, and several improvements have been made to the building, the report ends as usual in an urgent appeal for more funds to carry out necessary extensions. Applications for admission have to be refused almost daily. Two semi-detached houses and two cottages have been bought for the use of the staff, but the building of new villas has not yet been commenced. A new farm is to be added, and a house has been chosen at Witham, which, although it can only be a sub-branch, will at least accommodate 33 more adult patients. Bridge Home at Witham now houses 257 patients of the lowest grade. An idea of the work here is given by the statement of the Medical Superintendent that during the year the staff had to deal with 4749 wet beds, 1157 dirty beds, 1922 boys dirty in the day-time, and 2546 epileptic fits. The number of fits has been greatly reduced during the last few years by the use of luminal. The various shops all did excellent work and made good profit. The brush shop made 9123 brooms and brushes, and the shoe-shop made 300 pairs of new boots, as well as doing all the repairs for the branch—over 30,000 pairs. The School Guides and Brownies have now taken 300 second-class and proficiency badges, and although there is no complusion every girl in the school belongs to the company or pack. The frontispiece of the report is a photograph of part of the company, which appeared—to everybody's immense delight—on the outside cover of "The Guide," the official organ of the Girl Guides Association. The scouts have already won 23 badges, and the team came out fourth on the

list for the Ambulance Shield. Attempts are being made to get more boys working in the garden, as those who go out will probably have to earn their living on the land, and the Medical Superintendent feels that a boy can be kept too long doing simple handicrafts which he has completely mastered. The institution has now begun to act as a day school as it was obviously uneconomical for the local authority to open a day-centre with the Royal Eastern Counties Institution so near. There is very little illness among the children. One cold February day there were 20 patients in bed out of 1100 in residence. Nursing a mental defective, therefore, is chiefly a matter of being able to teach a child to keep clean and happily occupied, and the Medical Superintendent welcomes the extension of the R.M.P.A. examination to include proficiency in any one of four main sections of the work of a big modern institution. The death-rate was 1·74 per cent., which includes two deaths of patients who had been on leave of absence for a year or more. The tuberculosis death-rate was 0·58 per cent., a remarkable drop from 4·6 per cent., which was the average figure from 1859 to 1904. Since a general Schick test in 1925, and the immunisation of all susceptibles, there have been no cases of diphtheria.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED AUGUST 31ST, 1929.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 131 (last week 139); scarlet fever, 1833; diphtheria, 850; enteric fever, 84; pneumonia, 522; puerperal fever, 64; puerperal pyrexia, 114; cerebro-spinal fever, 16; acute poliomyelitis, 24; encephalitis lethargica, 20; continued fever, 1; dysentery, 5; ophthalmia neonatorum, 128. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the Metropolitan Asylums Board on Sept. 3rd–4th was as follows:—Small-pox, 165 under treatment, 8 under observation (last week 144 and 24 respectively); scarlet fever, 1335; diphtheria, 1405; enteric fever, 18; measles, 311; whooping-cough, 220; puerperal fever, 23 (plus 8 babies); encephalitis lethargica, 124; poliomyelitis, 1; "other diseases," 18. At St. Margaret's Hospital there were 13 babies (plus 5 mothers) with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns, including London, there was no death from small-pox, 2 (0) from enteric fever, 20 (0) from measles, 6 (2) from scarlet fever, 22 (4) from whooping-cough, 19 (4) from diphtheria, 78 (10) from diarrhœa and enteritis under two years, and 18 (2) from influenza. The figures in parentheses are those for London itself.

Of the deaths from diarrhœa (the fewness of which is gratifying) 8 were reported from Liverpool, 6 each from Birmingham and Hull, 5 from Sunderland, 3 each from Portsmouth, Southend-on-Sea, Leeds, and Gateshead. The deaths from enteric fever occurred at Southport and Cardiff.

The number of stillbirths notified during the week was 267, corresponding to a rate of 40 per 1000 total births, including 46 in London.

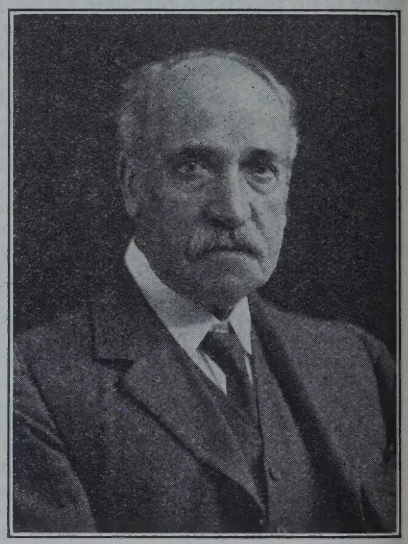
THE LONDON HOSPITAL.—The House Committee reports that last year the in-patients numbered 14,049 and stayed on the average 17·67 days. The out-patients numbered 70,962 and a further 25,966 persons suffering from minor ailments were dealt with in the receiving room. The income was £316,000 and the expenditure £276,000. In-patients cost £5 13*s.* 5*d.* each and out-patients 15*s.* 6*d.* The report for the quarter ending August 31st states that the radium department is now in working order. The radium is kept in a safe in a strong room, encased in 7½ tons of lead. The gramme of radium which has been delivered is being used for the making of radon, but as more can be made than is actually required arrangements have been made for supplying it, at a charge, to other hospitals and to members of the staff for private cases. A second gramme will be delivered shortly in the form of needles.

Obituary.

SIR SEYMOUR SHARKEY, D.M. OXF., F.R.C.P. LOND.

THE death of Seymour John Sharkey at his home in London removes almost the last of a band of men to whom the school of St. Thomas's is indebted for its re-establishment in the honourable position it held prior to the temporary eclipse occasioned by its migration from Southwark to Lambeth.

Seymour, one of the three talented sons of Dr. E. P. Sharkey, an Irish medical man, was born in 1847. Educated at Christ's Hospital, he gained a classical scholarship at Jesus College, Oxford, of which College he was elected an honorary Fellow in later life. His inclinations passed at an early period from classical study to that of science, and he gained a first class in the honour school of natural science. He thus came under the influence of one of the masters of modern biological research, Prof. G. Rolleston, F.R.S. Sharkey became one of Rolleston's demonstrators, and this association without doubt remained a lasting influence both on his line of thought and his conception of what the life of a physician should be. His Oxford career ended with his election to a Radcliffe Travelling Fellowship in 1873, and his medical life commenced with experience gained in continental universities, particularly in Germany, followed by entrance at the school of St. Thomas's Hospital. After qualification in 1875 he became resident assistant physician to the hospital. At the termination of his period of office he was much shaken by the death, attributed to overwork, of one of his brothers, so much so that it was thought advisable by his friends that he should seek an absolute change of occupation and surroundings. Hence he spent some time travelling abroad, returning later to be elected assistant physician to the hospital. This episode is worthy of mention because it explains the rigid rule, maintained for the rest of his life, not to allow any consideration to compel him to see more than a certain number of patients daily or to interfere with his week-end relaxation.



SIR SEYMOUR SHARKEY.

Photo by Elliott & Fry.

Once elected on to the staff of his hospital Sharkey's energies were devoted largely to the work of the institution and to the furtherance of medical education. His teaching was well informed, sound, and effective, and many generations of students retain grateful memories of the help they received from him. He was certainly for a long period the most popular teacher in the school. The work of the hospital was performed with energy and precision. Visits were never missed, never commenced late, or terminated too early, and Sharkey gave confidence to the patients, to the

juniors, and to the nursing staff; by all he was respected and indeed beloved. His interests were with medicine in general, but in his early days he acquired a reputation for special knowledge as a neurologist as a result of clinical observations connecting localised disease of the brain with definite symptoms and signs, and this work justified his later election as President of the Neurological Society. Admitted a Member of the Royal College of Physicians in 1879 he became a Fellow in 1885, and in the following year delivered the Goulstonian lectures, on Spasm in Chronic Nerve Disease, which were published in THE LANCET. His subsequent association with the Royal College of Physicians was intimate, for he acted as examiner and served the College as Censor for some years, becoming Senior Censor in 1912. In 1906 he delivered the Bradshaw lecture on "Rectal Alimentation" (THE LANCET, 1906, ii., 1263). He was knighted in 1914, but declined a second honour offered him for his services when he retired from office as medical referee to the Treasury.

Sharkey was above all things an enthusiast in clinical medicine. More than any other part of his work he loved teaching, and his pupils of all degrees, and over many generations, recognised and appreciated his efforts, though they sometimes smarted under his incisive tongue. He will be remembered with gratitude and affection in many parts of the world by a wide circle of those who profited by his teaching or were inspired by his example. Sir George Makins, for whose recollections of Sharkey's earlier career we are indebted, sends us the following personal note.

Sharkey's choice of St. Thomas's as his school was determined by the reputation of Charles Murchison as a clinical teacher, and his own method was no doubt founded on the lines adopted by Murchison. St. Thomas's, however, at that period was fortunate in the possession of a gifted clinical teacher of a more philosophic turn of mind, John Syer Bristowe, and it is probable that a just comparison between the methods of the two men preserved Sharkey from the superlative dogmatism which dominated Murchison's teaching. Murchison's method was perhaps ideal for candidates preparing for examination, Bristowe's for enlarging the man's horizon and creating a proper scepticism regarding certain received beliefs. With Murchison an answer was either right or wrong; Sharkey, while adopting Murchison's precision, was always open to argue the point, and in such discussions he delighted. His pupils had a certain fear of his sarcasm and were not always convinced by his reasoning. A characteristic example of his sense of fairness and right in the management of his school was exhibited shortly after his appointment to the assistant staff. At that time the entire sum derived from the fees of the students after the expenses of administration had been deducted was divided amongst the members of the senior staff. Sharkey and his immediate surgical colleague, Clutton, attacked this arrangement with great vigour, and it is of interest to recall that they only carried the day when on election to the senior staff they acquired sufficient influence to bring about a change by which they suffered personal loss.

No sketch of Sharkey would be complete without mention of two friends who materially influenced his habits and career. His association with H. H. Clutton commenced with their respective appointments as senior residents at St. Thomas's and persisted until Clutton's premature death. Until Clutton's marriage they lived together. There was little resemblance between the two men; Sharkey was of a philosophical turn of mind, Clutton eminently and severely practical, and this diversity perhaps explained the permanence of the association. The two men never wearied of discussing and arguing on any subject which interested them. Sharkey was one of the early physicians to welcome the aid of surgery, and a bedside consultation between the two men was a source of real pleasure to their respective classes. When a difference of opinion arose the two chiefs would attack each other with freedom and familiarity, and doubts as to who would be the winner enlivened the audience. His other most intimate friend was Sir George Savage, who was the companion of his hours of relaxation. They fished, played golf, and gardened together. Sharkey was an expert dry-fly fisher and could bring home trout when no one else could find or lure them.

Sharkey maintained a semblance of unchanging age until some six months before his death. He was never married, but he delighted to entertain in his charming home. It was as a host and also at the meetings of a small dining club, of which he remained a member to the end of his life, that his social talents showed to best advantage. In his last years he was to be found on most afternoons in the smoking room of the Athenæum reading and chatting with his friends. Sharkey's strict sense of honour, absence of any shadow of self-seeking, and conscientious fulfilment of the duties he undertook brought him many friends and gained for him the respect of all those with whom he was associated.

Dr. T. Dyke Acland writes: I first knew Sharkey when he was an undergraduate at Oxford. He was then, as he remained all his life, full of fun, active, energetic, and enthusiastic. He carried his vitality into his work as well as into his play. Wherever he was he gained for himself the affection and confidence of his teachers, friends, and fellow students. At Oxford he came under the influence of Sir Henry Acland, Sir J. Burdon Sanderson, and Prof. Rolleston, and remained on terms of intimate friendship with them all until their deaths. It was under the direction of the Regius professor that he commenced the practical work in a clinical laboratory which he later developed so successfully at St. Thomas's Hospital. Throughout his career Sharkey was always ready to help and advise those who were in difficulty, and though some found his manner brusque and his criticisms outspoken, he was recognised to be a wise counsellor whose opinions should not be lightly disregarded. Sharkey had a strong and vigorous personality. He spent his life doing that which he believed to be right, and spoke the truth from his heart.

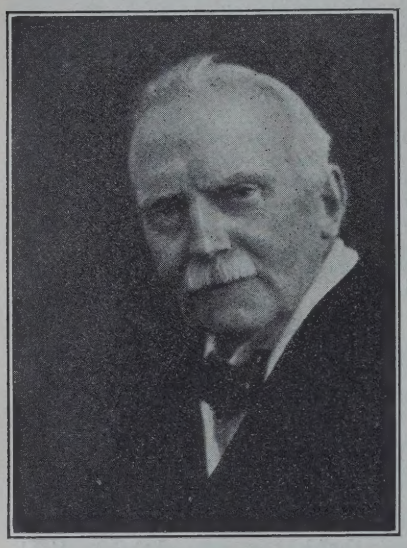
FREDERICK FOORD CAIGER, M.D., F.R.C.P. LOND., D.P.H.

Dr. Foord Caiger died rather suddenly on Sept. 5th while on holiday in Scotland, and his death will leave a blank in the lives of a large circle of friends and colleagues who had found in him a wise clinician, an able administrator, and a loyal friend.

Frederick Foord Caiger was born in December, 1860, the son of Frederick Henry Caiger, F.R.I.B.A., architect to the Metropolitan and City Police. He was educated at Westminster School and St. Thomas's Hospital, where he was Mead medallist, and from which he qualified in medicine at London University in 1883, being awarded the gold medal in surgery and honours in other subjects. Three years later he took the M.D. Lond., and shortly after the D.P.H. Cambridge. He held three house appointments at St. Thomas's Hospital, and five years after qualifying entered the service of the Metropolitan Asylums Board as assistant medical officer at the Northern Fever Hospital, where his work was such as to lead to his appointment as medical superintendent of the South-Western Hospital, Stockwell, before he was 30 years old. This office he held continuously until October, 1926, when he retired from the service of the Board after an association of 39 years. For the last five years of this period he was chief medical officer of the whole infectious hospital service, and was called upon to guide the policy of the Board in such matters as the best allocation of beds among the various kinds of infectious fevers, the employment of the new immunity tests, and the early administration of antitoxin in diphtheria.

In 1921 Caiger was appointed emeritus physician to St. Thomas's Hospital. As a clinician and a teacher he then had a reputation, both within his own hospital and outside, which was second to none. He was

clinical teacher in fevers to the R.A.M.C., and it was a tradition with St. Thomas's students that their fever course should be taken with him at the South-Western Hospital, where, unless application were made at the earliest possible moment, there was but little chance of getting on the list. His lectures were lucid and stimulating, and his clinical demonstrations first-rate. Caiger was always abreast of his subject, and readily adopted any innovation of value, be it for diagnosis, treatment, or prevention. But he never lost the sense of perspective, and we have many testimonies to the excellence of his advice and the soundness of his diagnosis. Although he never published a text-book on fevers, Caiger was much in request as a writer on his subject, and his contributions to Allchin's Manual, Quain's Dictionary, and Allbutt's System are well known. He was always ready to accede to the requests of local medical societies and of the Medical and Physical Society at St. Thomas's for an address on some topic of interest connected with his specialty. His interest did not lie only with the clinical side of medicine; like all good clinicians he recognised pathology as the basis of sound clinical advance, and it was on his advice that the Board in 1925 appointed a Director of Research and Pathological Services, and decided to establish two thoroughly equipped group laboratories. Caiger was the first chairman of the Scientific Advisory Committee set up by the Board, after consultation with the Medical Research Council, to advise on the extension of knowledge by research and the full and prompt application of available knowledge to fever practice. He was a member of the Antityphoid Inoculation Committee appointed by the Army Council in 1904 and played a large part in the long and difficult investigations involved in the preparation of their report. In his Bradshaw lecture, delivered the same year before the Royal College of Physicians of London, he gave a masterly survey of the treatment of enteric fever as then practised, registering his conclusion that any further advance in treatment must be sought in biological sources.



DR. FOORD CAIGER.

Photo by Elliott & Fry.

Caiger possessed in high degree the qualities required for successful administration and organisation, and these stood him in good stead when he was commissioned to open the Fountain Hospital during an exceptional incidence of scarlet fever in 1893, and six years later when 500 beds were provided at the Grove Fever Hospital to meet an unusually high seasonal rise of enteric fever. He took a personal interest in the welfare of the hospital staff generally and individually, and succeeded in gaining their loyalty and devotion and in no small degree their affection. It was largely owing to him that the Fever Nurses Association was founded. He was its hon. treasurer from the start and at one time its president. Caiger's relations with his fellow practitioners in his neighbourhood were cordial and intimate. At St. Thomas's it was to him that application was made for assistance in the thorny problems of accidental infections, and many a resident had reason to be thankful for his ready help and solicitous treatment. Local practitioners found him sympathetic with their difficulties and tactful with their mistakes. "We all learned," one of them writes, "to come to him, knowing full well that he at least would never make us feel that we had been grossly stupid or unobservant." "Among Caiger's charms," another writes, "was a natural and sympathetic consideration for everyone with whom he worked. The only way to make him bristle aggressively was to suggest some adverse criticism of his staff or of the Board to which he was loyalty itself. Any lack of consideration to a subordinate would promptly arouse his condemnation; at the same time he was magnanimous in his praise of any effort to do the right thing."

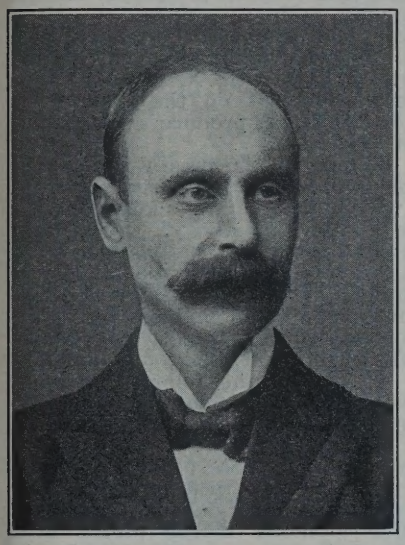
On his retirement from the Metropolitan Asylums Board three years ago, Caiger's help remained available to private practitioners in their clinical problems. He remained active on the Governing Body and Executive Committee of the Enham Village Centre for the curative treatment and training of disabled ex-Service men, to the organisation of which he had given much time and thought. Of his personal characteristics little more need be said than what has appeared in connexion with his professional work. His tastes were simple and he had a deep appreciation of natural beauties which made his companionship on foreign travel pleasant and stimulating. He was a good impromptu speaker, with just the right touch of hesitation in choosing the appropriate phrase or illustration which always came. He lived, as one of his friends puts it, every moment of his life to its fullest and best.

Dr. Caiger married in 1895 Madeline, daughter of Alexander Orr, a landed proprietor in Australia, who survives him. Their only son was killed on the Western front in November, 1916.

SIR JOHN CAMPBELL, M.D., M.CH., LL.D. R.U.I., F.R.C.S. ENG.

Sir John Campbell, who died on August 31st at his home in Craigavad, Belfast, was born in 1862, being a son of the Rev. Robert Campbell, of Templepatrick, Co. Antrim. He was educated at the Royal Belfast Academical Institution and at the Royal University of Ireland, and also studied in London and abroad. He took a degree in biology with first-class honours in 1883 before turning to medicine, when he gained a scholarship in therapeutics and pharmacology and the Coulter exhibition at the Belfast Royal Hospital. John Campbell qualified and proceeded to acquire the higher degrees in medicine and surgery in quick succession, becoming F.R.C.S. Eng. in 1891. He served as demonstrator of anatomy under the late Prof. Peter Redfern for five years, and for a time held the post of assistant surgeon to the Belfast Hospital for Sick Children. Later he took up gynæcology and obstetrics, and became consulting surgeon to the Maternity Hospital for Women. His name is chiefly associated with the Samaritan Hospital for Women, to which institution he was attached as surgeon, and later as senior surgeon for many years. He worked hard not only to establish the prestige of this hospital but to raise that of his specialty throughout Ireland, and succeeded well in this task. His publications included successful text-books as well as original articles. In 1909 John Campbell's services to medicine were recognised by the honorary degree of LL.D. of the Royal University of Ireland. When the Northern Parliament was formed in 1921, he was elected as one of the four Unionist Members for Queen's University, and he sat in the House until Parliament was dissolved this year. At the time of his death he was Chairman of Convocation. During the war John Campbell acted for a time as surgeon to No. 5 British Red Cross Hospital at Wimereux. He was knighted in 1925.

Prof. Andrew Fullerton writes: "The passing of John Campbell removes an outstanding figure from the community of Northern Ireland, where he has occupied a prominent position for a period of nearly 40 years. A man of great ability, wide culture, and transparent honesty, he commanded the admiration and respect of a large circle not only in his own country but far afield. His industry at the Samaritan Hospital and in practice, regardless of financial return, brought its reward, and in a few years he gained a reputation for ability, skill, and judgment which most men take long to attain. His success as a surgeon did not spoil him, and he remained the same modest, unassuming rock of common sense who had impressed his fellow students in his undergraduate days. Few medical men of his time have not at some period of their lives confided their troubles to him, and sought and obtained his sage advice. In the Parliament of Northern Ireland he proved himself a wise counsellor whose opinions carried weight with politicians of all sides.



SIR JOHN CAMPBELL.

"To the public, he was a man of few words, downright in his manner of expressing himself, and to all appearance stern and reserved. To the inner circle, however, he was a most charming companion. His education had been conducted on liberal lines and he had a mind well stored with information, but his strong sense of humour saved him from imparting more than would interest or entertain his listeners. A superficial observer might have thought him unsympathetic, but those of us who were intimate with him knew that he had a kind and sympathetic heart. He was greatly affected by his war experience. I remember when he first came to France, meeting him at the boat and taking him to visit some of the hospitals, to show him the kind of work he would be expected to do. At the end of the first days he felt the strain badly, but he carried on and did good work. His colleagues at No. 5 British Red Cross Hospital will hear with great regret of his death and will think of him with the kindest memories and with warm appreciation of his services."

PERCY CHARLES WOOLLATT, F.R.C.S. EDIN., M.D. BRUX.

Mr. Percy Woollatt, who died recently as the result of a motor accident in Normandy, was younger son of the late Mr. S. P. Woollatt, J.P. for Hertfordshire. He took the conjoint qualification from the London Hospital in 1905, later adding the M.D. Brux. and the F.R.C.S. Edin., and entering the Indian Medical Service was stationed at Shiraz, where he had charge of the Indian Government Hospital, and was medical officer to the telegraph department. Later he was surgeon to the Imperial Hospital at Teheran, and his surgical skill became notorious throughout Persia, securing him a freedom of movement in a dangerous country which was denied to many of his colleagues. On the outbreak of war in 1914 he volunteered for service in the navy and was appointed to the Haslar Hospital. On his return to South Persia it was as surgical specialist to the Forces there until 1920, when he retired from foreign service and took up general practice at Hinckley, Leicestershire, with charge of the Cottage Hospital. Lately he was consulting surgeon in London. His elder son is a medical student.

DR. WALTER ERICHSEN (ERIC) POWELL, who died on August 31st, as the result of appendicitis, was in his 35th year. He was educated at Brighton College and Charing Cross Hospital, qualifying M.R.C.S. in 1917. He then joined the navy and was appointed to a "Q" boat in which he saw service in the Mediterranean. When the Armistice was declared he returned home to join his father, Dr. W. A. Powell, in practice at Brighton. He was anæsthetist at the Brighton Poor-law Infirmary, and deputy anæsthetist at the Throat and Ear Hospital. He also acted as deputy police surgeon. He leaves a widow, who was formerly a sister at Charing Cross Hospital, and six children.

Correspondence.

"Audi alteram partem."

ON RESTARTING THE HEART-BEAT.

To the Editor of THE LANCET.

SIR,—Experiments I carried out on cats six or seven years ago showed that the heart could be restarted (and could thereafter raise the blood pressure to 100 mm. Hg) even so long as an hour and sometimes two hours after it had ceased to beat (B.P. = 0). The method employed was intracardiac injection of adrenalin along with either artificial respiration or instillation of oxygen into an artery—generally the femoral, using the profunda femoris as a cannula. Spontaneous breathing was never resumed if the B.P. had been nil for over 15 minutes. If the heart had completely ceased beating for only 5–10 minutes, then natural respiration might reappear, but the cat (though it sometimes lived for 24 hours) was never normal, and in behaviour closely resembled a decerebrate animal.

From all my observations I concluded that if the circulation had entirely ceased (B.P. = 0) for five minutes, the cerebrum never revived. After ten minutes the central nervous system was dead down to the pons, after 15 minutes down to the calamus scriptorius. It seems therefore hopeless to look for complete recovery of all the faculties in man if the circulation has entirely ceased for even five minutes, and restarting the heart and continuing artificial respiration if the heart has ceased to beat for so long, as 15 minutes is a useless waste of energy. In cases in which complete recovery has been reported at later periods, probably the circulation had not, in fact, entirely ceased.

The lesson to be learned from these facts is that cardiac massage, adrenalin injection, and artificial respiration must be applied at the earliest possible moment if valuable results are to be attained, and that they should be resorted to in all cases where the heart seems to be stopping before actual cessation has occurred.—I am, Sir, yours faithfully,

THOMAS LUMSDEN.

Lister Institute of Preventive Medicine, London, S.W., Sept. 7th, 1929.

CEREBRAL LOCALISATION.

To the Editor of THE LANCET.

SIR,—In a short notice in the last issue of THE LANCET of a book by Dr. R. Brugia, the reviewer seems to treat the ideas put forward by the author

as something new, and asks pertinently: what is meant by "centre" and what by "localisation"? On the clinical side Marie, working at the same hospital as Broca but with a more extensive choice of subjects, proved that Broca's theory of localisation was untenable. His positions are set forth in the work of Dr. F. Moutier, "L'Aphasie de Broca." Prof. von Monakow in his "Über Lokalisation der Hirnfunktionen" arrived at conclusions concordant with those of Marie. Since then many authors, notably a school of Italian physicians, have further subjected Broca's theories to a destructive criticism.

In 1912 I published my "Psychology: A New System," in which on purely psychological grounds—borrowing from physiology only the hypothesis that the development of the brain has been "economic"—I made it clear that it could not be stated categorically that Broca's theory was right or wrong, for the whole conception that underlay his localisation was faulty. The demonstration that I offered found confirmation in Marie's observations, but it should be looked upon rather as giving the necessary underlying explanation of the results at which that great neurologist had arrived. The methods I employed were the developments of the elaborate analysis on which I based the entire system of my psychology; but an indication may be given which will show that Broca's theory of aphasia is inconsistent even with that of the "centres" involved. The analysis of any word, when its meaning is fully comprehended, would imply the activities of a series of "centres" corresponding to visual, aural, tactile, and muscular sensations, and this fact in turn implies connecting nerve paths sufficient to supply the necessary associations. Thus we find that remote though associated parts of the brain are in activity during each movement, however simple, of consecutive ideas, and this activity is not merely that of primary excitation but also of corresponding inhibitions. As Sir William Gowers remarked, the brain is not like a piano, but rather like an organ; I would say, it is more like an elaborate system of charged telegraph wires.

Now, to represent the matter strikingly, I submit that when our histology has been perfected and our physiological psychology further advanced, then, with delicate instruments, it would be possible, without touching the third left frontal convolution, to produce not only Broca's aphasia but a veritable assortment of aphasias. The proper image to be formed is not that of "centres," but of a complete system of interrelated activities. What has been called a centre is not a terminal station, but, to use von Monakow's expression, a gate.

I am, Sir, yours faithfully,

ARTHUR LYNCH.

Haverstock Hill, N.W., Sept. 6th, 1929.

EFFECT OF X RAYS ON BLOOD PLATELETS.

To the Editor of THE LANCET.

SIR,—In a paper by Dr. Samson Wright and Dr. H. A. Bulman, published in your issue of August 3rd (p. 217), on the Selective Action of X Rays on the Blood Cells of the Cat, some observations on the effect of irradiation with X rays on the blood platelets show a substantial agreement with similar observations on the effect of gamma rays from radium, published by us in 1922.[1] Instead of drawing attention to this agreement Dr. Samson Wright and Dr. Bulman give an incorrect account of our results and conclusions and state that their results are contrary to our experience In view of the importance of the subject and of the promise of a more detailed publication by them it may therefore be well to restate briefly our results.

We found in experiments on rats that exposure to gamma rays produces a thrombopenia. If the doses were moderate—i.e., sublethal—the number of platelets shows a rapid spontaneous recovery to the normal. Dr. Wright and Dr. Bulman found the same after exposure to X rays. If the dosage of gamma radiation was increased we found that the number of platelets did not rise again, an anæmia developed, and the animals died. In our experiments the animals died in the third week—later than in the experiments of Dr. Wright and Dr. Bulman. At death our animals exhibited signs of a general infection. Our experimental observations agree with the clinical observations that cases of pernicious anæmia have occurred among radium workers. In these human cases there has also been evidence of a general infection. Between the observations on rats with radium and on cats with X rays there is, therefore, complete agreement on the main point that large doses of irradiation produce a diminution in the number of platelets.

An apparent discrepancy is presented by the platelet counts of two cats in Dr. Wright and Dr. Bulman's series which died or were killed on the seventh and tenth day respectively. Both these animals were heavily infected but the platelet count was stated to be "normal." It was 1·5 millions in one animal, 0·75 million in the other. Dr. Wright and Dr. Bulman comment on these findings by saying that they are "contrary to the experience of Cramer, Drew, and Mottram with the rat, who found a marked decrease in the platelet count following gamma radiation in animals that died of intercurrent infections." On this point we wish to remark, first of all, that we did not make the statement in this form. We found a decrease in platelets following gamma radiation whether the animals died of intercurrent infections or whether they survived. Secondly, our animals died after a much longer period after exposure (17–20 days) than the cats of Dr. Wright and Dr. Bulman (7 and 10 days). Since in their surviving animals the onset of the thrombopenia did not begin until the twelfth day, the two cats with a count stated to be normal died before the thrombopenia had time to develop. Lastly, the authors state that the platelet count of normal cats in their series varied from 0·75 million to 5 millions. No such wide variations are found either in normal rats or in man. If this statement is correct it would suggest that cats are not the most suitable animals for the study of variations in the number of blood platelets.

We are, Sir, yours faithfully,

W. CRAMER,
J. C. MOTTRAM.

Imperial Cancer Research Fund, Radium Institute, Sept. 6th, 1929.

[1] Proc. Roy. Soc., 1922, xciii., 449.

DISINFECTANT PACKETS.

To the Editor of THE LANCET.

SIR,—Dr. Earp's letter in your issue of Sept. 7th (p. 530) has drawn my attention to a quotation in the report of my remarks at the Fourth Imperial Social Hygiene Congress (THE LANCET, 1929, ii., 140) which may give rise to a misunderstanding. In quoting the statistics mentioned I applied the expression "for what it is worth" to my remembrance of the figures, mentioning that I was speaking from memory, and promising to bring the original documents to the next session in order that those interested might verify the figures. Unfortunately, your necessarily abbreviated report of the proceedings has made it appear that I applied the expression "for what it is worth" to Prof. Queyrat's figures—which was far from my intention. These figures and others bearing on the same question, to which I would refer Dr. Earp, can be seen in *Mouvement Sanitaire* (1927, iii., 607–15), and in Prof. Queyrat's address before the Assembly of the Union Internationale contre le Peril Venerien, Nancy, 1928. (Texte des Rapports, p. 50.)

I am, Sir, yours faithfully,

S. NEVILLE ROLFE,
Secretary-General.

Carteret House, Carteret-street, London, S.W., Sept. 9th, 1929.

COUNTY MEDICAL OFFICERS OF HEALTH IN IRELAND.

THE Department of Local Government and Public Health of the Irish Free State is pressing for the appointment of county medical officers of health, and it is understood that four or five appointments will shortly be made. Our local correspondent informs us that several counties are still reluctant to take action. For example, the South Tipperary County Council and Board of Health have passed resolutions protesting against the proposed appointment of a county medical officer as expensive and unnecessary, having regard to the existing dispensary doctors. The Leitrim County Council has adjourned the consideration of the question on the grounds that the appointment is unnecessary. One member of this council expressed the opinion that there was no sense or reason in appointing a county medical officer of health when the children of the county were underfed and underclothed. Before they looked after the eyes and teeth of the children they should see that they were properly fed. It is clear that the country is still badly in need of education on the value of health to the community. Apart from the delay in making appointments Ireland's sanitary administration has to face another danger. The salaries offered for county medical officers of health are small, and are not likely to attract men of adequate experience. There is a grave danger that men with paper qualifications only, and without practical experience, may be appointed. Up to the present there has been no public health system in force in Ireland, so that Irish medical men have had little opportunity of gaining experience in their own country. The best hope of acquiring experienced administrative officers may be to attract candidates who have worked in England or elsewhere, but the salaries offered are not likely to achieve this result.

LABELLING OF POISONOUS SUBSTANCES.

ON August 19th, at Shoreham (Sussex) Petty Sessions, a grocer and provision merchant of Lancing was summoned for selling a certain quantity of carbolic disinfectant, containing not more than 3 per cent. of phenol, enclosed in a wrapper that was not distinctly labelled with the words "Poisonous, not to be taken," and did not have the name and address of defendant as the seller thereon. The defendant pleaded not guilty. Evidence of the purchase was given by a representative of the Pharmaceutical Society, who stated that she drew the defendant's attention to the fact that his name should have been on the bottle and that he agreed. She also pointed out that there were also no words to indicate that the contents were poisonous and were not to be taken. The defendant's solicitor produced a bottle and removing the wrapper asked witness if it did not say on the bottle, "Poisonous, not to be taken." Witness agreed, but said it contained no name and address of the seller. The Magistrate's Clerk: "Technically speaking, it should be on the wrapper." Defendant's solicitor said the section of the Pharmacy Act provided that it should not be lawful to sell any substance to which the section applied unless the box, bottle, vessel, wrapper, or cover in which it was contained was labelled with the name of the substance and the word "poisonous." Hence it was only necessary for one or the other to be so marked, and as the label appeared on the bottle the Act was complied with. He added that the bottle revealed the name of the seller—namely, the makers of the solution. The police superintendent pointed out that the Act meant by the seller the person making the sale. The sale was admitted. This lysol solution, said the defendant's solicitor, was barely poisonous, because it contained something less than 3 per cent. of carbolic, but apparently it came within the Order under the Act. Possibly his client had made a mistake in regard to not having his own name and address inscribed. The manufacturers of these substances, as a rule, warned the retailer at the time of purchase that the name of the retailer must be added when the substance was sold to the public. In this case no warning was received, and his client did not know that the substance fell under the Act. The defendant had been in business for 35 years without anything against him. There were no fewer than 965 Orders in Council affecting grocers, and for 35 years he had successfully steered through these 965 Orders in Council only to be held up through not putting his name on a paper wrapper. The police superintendent stated that defendant was a highly respectable tradesman, and that the proceedings were brought as a warning to others. The Justices dismissed the case on payment of costs.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg.-Comdr. P. L. Gibson to *Pembroke*, for R.N. Hospital, Chatham.

ROYAL NAVAL VOLUNTEER RESERVE.

Act. Comdr. R. P. Pim to *Excellent*, Surg.-Lts. A. R. Thomas to *Comus*, for training, and E. E. Henderson to *Vivid*, for R.N. Barracks, Devonport, for training.

Surg. Sub.-Lt. J. A. White promoted to Surg.-Lt.

Proby. Surg. Sub.-Lt. T. Colver to *Victory*, for R.N. Hospital, Haslar, for training.

J. K. Reid, Birkenhead, has been appointed Admiralty Surgeon and Agent for that district.

ROYAL ARMY MEDICAL CORPS.

Maj. N. Cantlie, M.C., half pay list, is restd. to the estabt., with precedence next below H. G. Winter, M.C.

Maj. H. H. Leeson, M.C., R.A.M.C., Res of Off., relinquishes his appt. under Art. 507 (b), Royal Warrant for Pay and Promotion, 1926, and resumes the rank of Lt.-Col.

Maj. (Qr.-Mr.) C. A. Figg, O.B.E., having attained the age for compulsory retirement, is placed on retd. pay.

TERRITORIAL ARMY.

Lt.-Col. (Bt.-Col.) F. Marsh (late R.A.M.C., T.F.), to be Hon. Col., R.A.M.C. Units, 48th (S. Midland) Div.

Lt. E. G. Oastler to be Capt.

W. H. D. Patterson and 2nd Lt. E. H. Brindle (late R. Scots) to be Lts.

ARMY DENTAL CORPS.

Lt. (on prob.) G. E. Nettleship is confirmed in his rank.

ROYAL AIR FORCE.

The undermentioned Flying Officers are granted permanent commissions in this rank: G. H. J. Williams, J. C. Neely J. Kemp.

Flying Officer J. M. Ritchie is promoted to the rank of Flight Lt.

Flying Officer A. C. Lysaght resigns his short service commission.

RESERVE OF AIR FORCE OFFICERS.

Flight Lt. J. D. Driberg is granted a commission in Class D.D.

Squadron Ldr. H. Harvey relinquishes his commission on completion of service and is permitted to retain his rank.

AUXILIARY AIR FORCE.

No. 601 County of London (Bomber) Squadron.—Flight Lt. J. D. Driberg resigns his commission on appointment to the Reserve of Air Force Officers.

Flight Lt. E. D. W. Reid is transferred from General Duties Branch.

INDIAN MEDICAL SERVICE.

Capts. D. P. McDonald, Amar Nath Sharma, and Naval Maneckji Pestonji Dotivala, M.C., to be Majs.

Temp. Lts. Karam Chand Virmani and Tolaram Bhojsing Pahlajani to be Temp. Capts.

Lt.-Col. J. K. S. Fleming retires.

Lts. E. G. Montgomery, G. F. Taylor, and Wajid Ali Khan to be Capts.

Lt. R. A. Haythornthwaite to be Capt. (prov.).

The undermentioned temp. officers are apptd. to permanent commns. as Lts.: Chandra Mani, Lakshman Dass, Prafulla Chandra Dutta, and Trilok Chand Puri.

Capts. to be Majs.: Kombar Ramaswamy Krishnaswami Iyenger, Madho Prasad, Girish Chandra Maitra, J. J. Rooney.

The following Capts. (prov.) are confirmed in their rank: Gurbaksh Singh Chawla, T. A. Malone, W. Scott, Bhagwant Singh Nat, V. A. Edge.

Lt.-Col. H. M. H. Melhuish, D.S.O. retires.

The *London Gazette* of Sept. 6th published under 14 paragraphs from the India Office the amended rules for the promotion and precedence of the Indian Medical Service contained in the Warrant of May 28th, 1913, and in such other Warrants granted since that date as are still in force.

COLONIAL MEDICAL SERVICES.

The following appointments are notified: R. E. Anderson, Medical Officer, Federated Malay States; Miss N. N. Lowther, Lady Medical Officer, Federated Malay States; L. E. Vine, Medical Officer, Federated Malay States; Miss C. D. Williams, Lady Medical Officer, Gold Coast; F. W. W. Fox, Medical Officer, Nigeria; F. Williams, Pathologist, Nigeria.

Appointments.

SCOTT, JOHN A., M.D. Liverp., D.P.H., has been appointed Medical Officer of Health for Shipley.

Vacancies.

For further information refer to the advertisement columns.

Albert Dock Hospital, Connaught-road E.—Surgeon. Also M.O. At rate of £110.
All Saints' Hospital for Genito-Urinary Diseases, Finchley-road, N.W.—Jun. H.S. Also Asst. H.S. At rate of £150 and £100 respectively.
Ashton-under-Lyne, District Infirmary.—H.S. At rate of £150.
Bangor, Carnarvonshire and Anglesey Infirmary.—H.S. £200.
Barrow-in-Furness County Borough.—Asst. M.O.H. and Asst. Tub. O. £600.
Birkenhead General Hospital.—Cas. S. £100.
Birmingham Ear and Throat Hospital.—Third H.S. At rate of £150.
Birmingham and Midland Ear and Throat Hospital.—Asst. Surg. O. £200.
Blackburn and East Lancashire Royal Infirmary.—Res. H.P. £150. Also 4th H.S. £130.
Bournemouth, Royal Victoria and West Hants Hospital.—Two H.S.'s. Each at rate of £120.
Bradford, Royal Eye and Ear Hospital.—Jun. H.S. £120.
Bristol City and County Mental Hospital.—2nd Asst. M.O. £500. Also 3rd Asst. M.O. £350.
Cape Town University.—Asst. Anatomist. £750.
Cardiff Royal Infirmary.—Gynæcological H.S. Also Ophthalmic H.S. At rate of £50 and £75 respectively.
Carlisle, Cumberland Infirmary.—H.P. £155.
Chelmsfield and Essex Hospital.—Res. M.O. At rate of £150.
Chichester Royal West Sussex Hospital.—Jun. H.S. £150.
Coventry City.—M.O.H. £1225.
Croydon General Hospital.—2nd Asst. for the Pathological and Bacteriological Laboratory. £3 10*s.* per week.
Cyprus, Pendayia Hospital.—Surgeon-Physician. £25 per month.
Dorchester, Dorset County Hospital.—H.S. At rate of £120.
Dreadnought Hospital, Greenwich.—H.P. and H.S. Each at rate of £110.
Dublin University, School of Physic, Trinity College.—Montgomery Lecturer in Ophthalmology. £150.
East Ham Memorial Hospital, Shrewsbury-road, E.—Res. M.O. At rate of £200.
East London Hospital for Children, &c., Shadwell, E.—Res. Cas. O. At rate of £125.
Evelina Hospital for Children, Southwark, S.E.—H.S. At rate of £120.
Freemasons Hospital and Nursing Home, 237, Fulham-road, Chelsea, S.W.—Res. M.O. At rate of £250.
Gloucester, Gloucestershire Royal Infirmary, &c.—Hon. S. to Ear, Nose and Throat Dept.
Great Yarmouth General Hospital.—Sen. H.S. £150.
Grimsby County Borough and Port of.—Part-time Clin. Tuberculosis O. and Assist. M.O.H. £750.
Guildford, Royal Surrey County Hospital.—H.S. £150.
Hampstead Parish of St. John, New End Hospital.—Jun. Res. Asst. M.O. At rate of £200.
Hospital for Sick Children, Great Ormond-street, W.C.—Asst. Path. and Research Fellow. £450. Also H.S. and H.P. Each at rate of £100.
Hull Royal Infirmary.—Asst. H.P. At rate of £130.
Indian Research Fund Association, Simla.—Bacteriologist. Also Research Worker. Each Rs.1500 per mensem.
Isleworth, West Middlesex Hospital.—Res. Asst. Med. Supt. and Asst. M.O. £450.
King's College Hospital, Denmark Hill, S.E.—Clinical Assistantships.
King's Lynn, West Norfolk and Lynn Hospital.—Sen. H.S. Also Jun. H.S. At rate of £150 and £100 respectively.
Lewisham Metropolitan Borough.—Asst. M.O.H. and Maternity and Child Welfare M.O. £650.
Liverpool, St. Paul's Hospital, Oldhall-street.—H.S. £120.
London Jewish Hospital, Stepney Green, E.—Hon. Asst. S. for Gynæcological Dept., Hon. Asst. Radiologist. Also Hon. M.O. for Actino-Therapeutic Dept.
London Lock Hospital, 91, Dean-street, W.—H.S. At rate of £200.
London Temperance Hospital, Hampstead-road, N.W.—Res. M.O. At rate of £175.
Manchester, Baguley Sanatorium.—Asst. M.O. £350.
Manchester Babies' Hospital, Burnage-lane, Levenshulme.—Jun. Res. M.O. At rate of £50.
Manchester, Salford Royal Hospital.—Two H S.'s. Also Cas. H.S. Each at rate of £125
Margate, Royal Sea Bathing Hospital.—H.S. At rate of £100.
Northampton, Northamptonshire County Council.—M.O.H. and School M.O. £1,100.
Norwich, Jenny Lind Hospital for Children.—Res. M.O. £120.
Norwich, Norfolk and Norwich Hospital.—H.S. £120.
Nottingham Children's Hospital.—Res. H.P. At rate of £150.
Nottingham General Hospital.—H.P. Also 2nd Cas O. Each at rate of £150.
Otago and Dunedin University Hospital, New Zealand.—Sen. Res. M.O. £500.
Port Said, British Hospital.—Res. A.M.O. £350.
Princess Louise Kensington Hospital for Children, North Kensington.—Hon. Radiologist.
Prince of Wales's General Hospital, Tottenham, N.—Sen. H.P. Sen. H.S., and Special H.S. Each at rate of £120. Also Jun. H.P., and Two Jun. H.S.'s. Each at rate of £90.
Rotherham Hospital.—H.S. £180.
Queen's Hospital for Children, Hackney-road, E.—H.P. Also Cas. O. Each at rate of £100.
Royal Chest Hospital, City-road, E.C.—Res. M.O. At rate of £150. Also Out-patient M.O. and H.P. Each at rate of £100.
Royal Dental Hospital of London, 32, Leicester-square, W.C.—Hon. Anæsthetist.
St. Leonards-on-Sea, Buchanan Hospital.—Jun. H.S. £125.
South London Hospital for Women, South Side, Clapham Common, S.W.—H.P. Also 3 H.S.'s. Each at rate of £50.
Swansea Hospital.—H.S. £150.
Swindon Corporation.—Asst. M.O.H. £600.
Talgarth, Breconshire, South Wales Sanatorium.—Sen. Asst. M.O. £350.
Torquay, Torbay Hospital.—H.S. £175.
Tunbridge Wells and Counties General Hospital.—H.S. £160.
Worcester General Hospital.—Jun. Res. M.O. £120.

The Chief Inspector of Factories announces a vacant appointment for a Certifying Factory Surgeon at Portland (Dorset).

Births, Marriages, and Deaths.

BIRTHS.

GILDING.—On Sept. 5th, the wife of H. P. Gilding, B.M., B.Ch. Oxf., of a daughter.

HORROCKS.—At a nursing home, Manchester, the wife of F. S. Horrocks, M.B., Ch.B. Manch., of Gravesend, of a daughter.

HURRELL.—On Sept. 6th, at the Penlea Nursing Home, Newcastle-upon-Tyne, to Dr. and Mrs. George Hurrell, 31, Deneholm, Monkseaton—a daughter.

TAUNTON.—On Sept. 3rd, at Campbell-road, Hanwell, W., the wife of R. E. M. Taunton, M.B., Ch.B. Edin., of a daughter.

MARRIAGES.

COOKE—COWIE.—On Sept. 5th, 1929, at the Parish Church, Banff, by the Rev. D. Findlay Clarke, B.D., Robert Victor Cooke, M.B., Ch.B. Bristol, F.R.C.S. Eng., eldest son of Mr. and Mrs. John Cooke, Berkeley, Gloucestershire, to Betty Cowie, M.D., B.S. Lond., M.R.C.P. Lond., elder daughter of Hugh Gordon Cowie, M.A., M.D., Banff, Scotland.

FARR—EMERY.—On Sept. 2nd, at Holy Trinity, Coombe Down, E. A. Farr, M.R.C.S. Eng., L.R.C.P. Lond., of Andover, to S. A. Emery, of Bath.

GREGORSON—HOWE.—On Sept. 4th, at All Saints', Horsford Parish Church, Norwich, Albert William Gregorson, M.D. Glasg., to Edith Evelyn Howe.

WILSON—SMITH.—On August 31st, at Tiviot Dale Chapel, Stockport, John Greenwood Wilson, M.D. Lond., M.R.C.P. Lond., younger son of the Rev. John Wilson, M.B.E., D.D., of Woolwich, to Wenda Margaret Hithersay, eldest daughter of Ernest J. Smith, M.A., LL.B., of Disley, Cheshire.

DEATHS.

AMBLER.—On Sept. 9th, at Ampthill, R. Ambler, Esq., F.R.C.S., L.R.C.P. & S. Ed., L.R.F.P.S. Glasg., aged 72, last surviving son of Dr. E. H. Ambler, of Hemel Hempstead.

CAIGER.—On Sept. 5th, suddenly in Scotland, Frederick Foord Caiger, M.D. Lond., F.R.C.P., late chief medical officer, Infectious Hospitals Service, Metropolitan Asylums Board, aged 69 years.

CRAIG.—On July 26th, at the Cottage Hospital, Fort Beaufort, Peter Latimer Craig, M.A., B.Sc., M.B., C.M. Glasg., D.P.H. Camb., of Balfour, Cape Province, S. Africa.

HARRIS.—On Sept. 6th, at Hartwood House, Chorley, Lancashire, James Alfred Harris, M.D. Lond.

LOCHHEAD.—On Sept. 2nd, at Desenzano, Italy, after a short illness, Mathew Lochhead, M.B., C.M. Glasg., B.Sc., of Snaxland, Clovelly, Devon.

SHARKEY.—On Sept. 6th, at Portland-place, London, Sir Seymour J. Sharkey, M.A., M.D. Oxf., F.R.C.P. Lond., consulting physician to St. Thomas's Hospital, aged 82 years.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

ENLARGEMENT OF DEAL HOSPITAL.—The Deal and Walmer War Memorial Hospital, which last year had a credit balance of over £1100, is to be enlarged by the erection of a nurses' home at the back, thus enabling the whole of the present building to be used as wards. The cost will be £10,000.

ST. BARTHOLOMEW'S HOSPITAL.—In his annual report, Lord Stanmore, the treasurer, states that the erection of the surgical ward block is making good progress and that the buildings should be ready for occupation by the beginning of next year. There will be five surgical units, each comprising a male and a female ward of 22 beds, with two small wards of one and two beds respectively attached to each section. Each unit has its own operating theatre, demonstration room, examination room, and offices. These buildings form part of the complete scheme of reconstruction. The Governors have approved a southern extension of Queen Mary's Home for the nurses, which will provide for 51 additional nurses. The in-patients last year numbered 9868 and cost £16 1*s.* 4*d.* each; the 94,303 new out-patients cost 11*s.* 1*d.* each. The income was £198,765 and the expenditure £201,774.

Medical News.

DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH.—Lord Rayleigh, F.R.S., Sir Arthur Balfour, Sir William Bragg, F.R.S., and Sir James Walker, F.R.S., have been appointed members of the Advisory Council in succession to Sir Harold Carpenter, F.R.S., Mr. G. C. Clayton, Ph.D., Sir Richard Glazebrook, F.R.S., and Sir James Jeans, Sec. R.S., who have retired on completion of their terms of office.

Dr. Leonard Nicholas Robinson, C.B.E., President of the Egyptian Medical Commission in Paris, has been granted His Majesty's royal licence and authority to wear the Insignia of the Third Class of the Order of the Nile, conferred upon him by the King of Egypt, in recognition of valuable services rendered by him.

TORBAY HOSPITAL CONTRIBUTORY SCHEME.—At the end of the first four months' working of this scheme the membership had reached nearly 15,000.

PAIGNTON HOSPITAL.—An enlargement of this hospital was opened last week by Mrs. J. A. Watson. It consists of a new wing, containing a men's ward, a women's ward, and accommodation for paying patients. The work has cost £15,000.

ANCOATS HOSPITAL, MANCHESTER.—A course of post-graduate lectures and demonstrations will be given during the Michaelmas Term on Thursday afternoons at 4.15 P.M., commencing on Oct. 17th, when Dr. W. J. S. Reid will speak on Hæmorrhagic Diatheses. A notice of each lecture will be inserted in THE LANCET of the preceding week. All medical graduates and senior students are invited, and there is no fee for the course. In addition to this course a post-graduate day of clinical teaching will be given by the honorary staff every Thursday during the Lent Term as part of the post-graduate scheme of the University of Manchester.

ASSOCIATION OF SPECIAL LIBRARIES AND INFORMATION BUREAUX.—The programme of the sixth annual conference, to be held at Trinity College, Cambridge, from Sept. 20th–23rd, has been issued. Among the subjects to be considered are the Ideal Form of a Journal from the Librarian's Point of View, Duplication and Infringement of Copyright, Technical English, the Training of Special Librarians, the Indexing and Classifying of Individual Collections of Data, and International Organisation of Information Services. A dinner will be held on Sept. 20th, when Sir J. J. Thomson, F.R.S., president-elect of the Association, will give an address. Full particulars can be obtained by those interested from the Secretary, A.S.L.I.B., 26, Bedford-square, London, W.C.

OPTICAL CONGRESS.—A congress and trade exhibition is being held at the Northampton Polytechnic Institute, St. John-street, London, E.C., to commemorate the tercentenary of the granting of the Royal Charter to the spectacle makers of the City of London. The congress was opened on Sept. 10th by Sir Osborn Holmden, Master of the Worshipful Company of Spectacle Makers. He said that at the end of last century the Company had decided to institute an examination for the craft, and at the present time nearly 2500 opticians held the Company's diploma. It was the object of the Company and of other optical bodies to raise the code of ethical practice among opticians and to ensure that persons afflicted by disease and needing treatment should be referred to ophthalmic surgeons.

"THE MIDLAND HOMŒOPATHIC AND GENERAL HOSPITAL" is the new name of the institution formerly known as the Birmingham and Midland Homœopathic Hospital and Dispensary. The 50 beds are always full, and 710 in-patients were treated last year; there were 3745 out-patients and 682 operations. The finances show an annual loss. The average cost per in-patient per week was £3 2*s*. 10*d*., as against £2 9*s*. 4*d*. in the previous year.

THE SHEFFIELD HOSPITALS.—The seventh annual report of the Sheffield Hospitals Council, which administers the penny-in-the-pound scheme, states that the total number of patients admitted to the four institutions last year was 15,433. Children, unemployed, and patients unable to pay towards their maintenance numbered 6051, and for these persons and the necessitous poor the Council expended £60,000. The casualties exceeded 49,000, an average of 134 per day; out-patients totalled just under 74,000. At the end of the year the waiting list contained 2687 names and the accumulated debt to the bankers exceeded £59,000,

Notes, Comments, and Abstracts.

MEDICAL EXAMINATION OF CANDIDATES FOR THE POLICE FORCE IN 1844.

THE standards of fitness for candidates for the most physically exacting of our national services were the subject of comment in our columns last week. We have received from Dr. A. P. Gibbons a copy of the instructions issued nearly a century ago, for the guidance of the surgeon to the police force of the City of London, on his duties when examining candidates for the Force, and it is interesting to compare the criteria of sturdy vigour then established with more modern ones. The document, dated 1844, reads as follows:—

Instructions for the Guidance of the Surgeon.

I. The leading object of the following instructions is to guard against the admission of candidates into the Force whose health of body or mind is unsound who have any suspected taint of disease or disability and who, at the period of Inspection, are incapable of undergoing fatigue. The Duties of the Force to be efficiently performed necessarily require that each Member should enjoy sound Bodily health, as well as a fair proportion of physical strength and an appearance likely to command obedience.

II. The Surgeon is from his knowledge of the Duties of the Members of the Force, presumed to be capable of forming a correct opinion of the health of Candidates their capacity for exertion and general efficiency. The external characters of a sound constitution and efficient limbs may be briefly stated, viz., a tolerably just proportion between the trunk and different Members of the Body a Countenance expressive of health with a lively eye—Skin firm and elastic—Lips red—Teeth in good condition—Voice strong—Chest capacious and well formed—Belly lank—Limbs muscular—Feet arched and of a moderate length—Hands rather large than small—The reverse of these marks of a good constitution and efficiency may be considered to indicate infirm health or inefficiency.

III. The question of fitness or unfitness of a candidate must in a great measure be determined by the discretion of the Surgeon for no rule can be formed of so definite a character as to dispense with the exercise of the deliberate reflection and judgment of a Medical Man.

IV. As policemen are liable to be exposed to frequent vicissitudes of weather and to undergo much fatigue Candidates should possess vigorous constitutions and great muscular capability; hence no Man ought to be approved for the Service whose health is unsound and who does not possess adequate strength for the duties which he may be called upon to perform.

V. The following enumeration of the more common causes for which Candidates should be rejected when any of them exist to such a degree as will immediately, or in all probability may at no very distant period impair a Man's efficiency, is intended as a general guide to the Surgeon in the performance of the duty of inspecting Candidates.

1. Feeble constitution, unsound health from whatever cause, indications of former disease, as Leech bites, traces of Blisters, thereby showing a liability to infirm health, nodes, glandular swellings, or other symptoms of Scrofula, &c.
2. Weak or disordered Intellect.
3. Chronic cutaneous affections, especially of the Scalp.
4. Severe injuries of the Bones of the Head.
5. Impaired vision from whatever cause, or Inflamatory affections of the Eyelids, immobility or irregularity of the Iris, Fistula Lachrymalis.
6. Deafness or copious discharge from the Ears.
7. Loss of many Teeth or the Teeth generally unsound.
8. Impediment of Speech.
9. Want of due capacity of the Chest and any other Indication of a liability to pulmonic Disease.
10. Impaired or inadequate efficiency of one or both of the superior extremities on account of palsy, old fractures, especially of the Clavicle, Contraction of a Joint, Mutilation, Extenuation, Deformity, Ganglions, &c., &c.
11. Lateral and other Curvatures of the Spine.
12. Hernia or a tendency to that disability from preternatural enlargement of the abdominal ring.
13. A varicose state of the Veins of the Scrotum or Spermatic Cord, Sarcocele, Hydrocele, Hemorrhoids, Fistula in perineo.
14. Impaired or inadequate efficiency of one or both of the inferior extremities on account of Varicose Veins, old Fractures, Malformations (flat feet, &c.), Palsy or Lameness, Contraction, Mutilation, Extenuation, Enlargement, unequal length, Bunions overlying or supernumerary Toes, Ganglions, &c., &c.

15. Ulcers or unsound cicatrices of Ulcers likely to break out afresh.

16. Diseases whether Acute or Chronic for which Medical treatment is required.

VI. Every Candidate is to be undressed before Inspection and it is directed that the Examination shall be conducted agreeably to the following Routine, by which means blemishes are not likely to escape detection.

VII. Upon entering the Inspection Room the Candidate is to walk a few times pretty smartly across the Apartment for the purpose of showing that he has a perfect use of his lower extremities. He is then to be halted and set up in the position of a Soldier under Arms with the Knees about an inch apart and examined both in front and rear from head to foot. Should no material defect be discovered during this Survey the Examination may go on. The Candidate is then to perform the following Evolutions:—to extend the arms at right angles with the trunk of the Body, then to touch the Shoulders with the fingers, next to place the backs of the hands together above the head in this position let him cough, while at the same time the Surgeon's hand is to be applied to the rings of the external oblique muscles. Let the Surgeon examine the Spermatic Cord and Testes, then pass his hands over the Bones of the Legs. The Candidate is next to be made to stand upon one foot, and move the ankle joint of each extremity alternately; when any doubt is entertained respecting the efficiency of this joint or any part of an inferior extremity he should be made to test his strength by hopping upon the suspected Limb for a short period, and the size and aspect of the corresponding joint or part of the opposite Limb should also be accurately compared. He is next to kneel on one knee, then on the other and subsequently on both knees. Let him then stoop forwards and place his hands on the Ground and while in this position it ought to be ascertained whether he be affected with Hemorrhoids. He is then to extend the superior extremities forward for the purpose of having his arms and hands examined, and with this intention he is to perform flexion and extension of the fingers and to rotate the forearm. The Head is next to be examined, including the scalp, ears, eyes, nose, mouth; the Surgeon is then to ascertain that he possesses the function of hearing, and the faculty of distinct enunciation. In regard to the mental faculties the Surgeon should invariably ask a Candidate a few short questions as what occupation he had previously followed, &c., &c., or adopt any other means which he may deem necessary to ascertain the condition of the intellect.

VIII. When a Candidate is approved the attestation is to be filled up and signed by the Surgeon.

IX. The Book required to be kept in regard to this Branch of the duty of the Surgeon is, a register of Candidates which is to be ruled so as to contain the following heads: (*a*) Date of examination. (*b*) Name of each Candidate. (*c*) Age. (*d*) Country of Birth (as England, Ireland or Scotland). (*e*) Previous occupation or Station in life. (*f*) Remarks and Observations.

Causes of Rejection.—Unsound Health. Weak Intellect. Traces of Scrofula. Muscular Tenuity. Chronic Cutaneous affections. Specks on the Cornea; Cataract. Deafness. Loss of many Teeth. Defective condition of the superior extremities in consequence of old fractures, contractions, &c. Deformed Spine. Hernia Inguinal on either side. Laxity of the ring of the external Oblique Muscles on either side. Varicose Veins, left or right Spermatic Cord. Disease of the left Testicle. Disease of the right Testicle. Hydrocele of either testicle. Defective condition of the Inferior Extremities in consequence of old fractures. Malformation. Varicose Veins of either legs. Ulcers, Wounds or Cicatrices of legs.

Modern Practice.

We understand that at the present time the question of fitness or otherwise of candidates for the City of London Police is largely left to the examining surgeon. Each candidate fills up a form on which he sets out his name, age, vaccination history, notes of illnesses for which medical attention has been required, and reports any history of hæmoptysis, fits, rheumatic fever, or discharge from the ears. He is asked on the same form whether he or any near relative has been afflicted with consumption, epilepsy, insanity, or nervous debility, whether he has ever been ruptured, and what, if his parents are not living, was the cause of their death. The surgeon then examines the candidates stripped, so that varicose veins, hernia, and deformities can be easily detected. His sight and hearing must be good and his organs sound; he should be six feet or more in height, have a mean chest measurement of 36 in., and weigh 11 stone or more when stripped. The use of the stethoscope has, of course, made unnecessary such full instructions as were offered to the surgeon of 1844, and has enabled a better estimate of the function of the respiratory and circulatory systems to be made, but it is remarkable how little our standards have altered since the early instructions were formulated.

SOME ASPECTS OF HOSPITAL PLANNING.

IN an address with this title, recently delivered before the Rotary Club at Welwyn Garden City, Mr. A. W. Kenyon, F.R.I.B.A., spoke of the choice of site for a general hospital, more especially as it might apply to a garden city. One of the most important factors was the selection of a really beautiful site, a point which often appeared to be overlooked, leaving architects to face the problem of fitting a hospital on to a difficult and unsuitable site. There were many reasons why this was so. The land might be given by a philanthropist who did not fully appreciate the requirements of future development, or the land might not be available in the particular district in which the hospital was required. In Welwyn, however, it should be quite possible to select an ideal site. It was essential in the first instance that the site should be large enough for future as well as present demands. There should be a broad frontage facing south and the ground fall gently towards the south, with access roads from the north and east, where there should be the shelter of a belt of trees. The amount of land required would depend on the type and size of the hospital to be erected. The modern tendency was to secure smaller hospitals in towns where noise is daily on the increase, and to make them tributary to larger hospitals in the country where fresh air can be obtained and plenty of space secured for gardens for convalescents. This ideal, he thought, should appeal to places like Welwyn which were making efforts to bring works and the workers from congested and noisy towns into the better environment of the country. The hospital of the future was going to be a very efficient building, which would provide for: (*a*) general patients who would come under the voluntary system; (*b*) paying patients who could only afford to pay a contribution towards the services rendered to them; (*c*) private paying patients who would be able to pay adequately for these services; (*d*) smaller wards; (*e*) special blocks, all of which were tending to increase the size of hospitals. If Welwyn was going to provide a hospital suitable for the county and so to relieve the more thickly populated towns, there was hardly any limit to the ultimate number of beds required. Having arrived at the probable number of beds ultimately needed, the hospital should be planned for the full accommodation, even if a small portion only was to be built. It was extremely difficult to add to an existing building if the future extension had not been thought out. There was the psychological effect to bear in mind, for donors would often contribute to some special department or would contribute towards finishing off a certain portion of the building. In new towns like Welwyn, run on idealistic principles, it should certainly be possible to plan a new hospital rather than adapt an existing building. To do the latter would be to find that when everything possible had been done, it was more than likely to prove a makeshift, uneconomical in planning, difficult to administer, and expensive to run.

PAINFUL FIBROSITIC NODULES.

To the Editor of THE LANCET.

SIR,—I offer the following suggestions for treatment. (1) Injections of fibrolysin; (2) paint painful nodules with analgit (the Analgit Co., 102, Wilmslow-road, Didsbury, Manchester); (3) a sodium iodide and sodium salicylate mixture; (4) soneryl grs. ii. at bedtime with a hot drink, to ensure sleep till other remedies get to work.

I am, Sir, yours faithfully,
C. G. S. BARONSFEATHER, M.D.

Bournemouth West, Sept. 6th, 1929.

A COURTEOUS ACT.

WE are in a position to supply the information desired by the Leicester Health Committee on the whereabouts of Dr. W. B. Castle, who earned the gratitude of the Committee by his services to a fellow passenger on the Ostend boat. Dr. Castle sailed on Sept. 7th for Boston, where he holds an appointment at the City Hospital, to resume the experimental work on the association of achlorhydria with pernicious anæmia which he reported to the Section of Medicine of the Royal Society of Medicine on June 11th. Dr. Castle's courtesy in escorting a woman whose labour had begun prematurely to her home in Leicester, and in attending her until he could procure suitable medical and nursing attention, was especially noteworthy since the incident curtailed his final visit to London before he sailed for America.

X.Y.—We understand that keraphen (or tetraiodophthalophenon), a preparation given by the mouth as a preliminary to cholecystography (see THE LANCET, August 24th, p. 400), may be obtained from Mr. James Picker, 686, Lexington-avenue, New York.

WE are informed that Prunol Products, Ltd. is continuing to place on the market the proprietary remedy for constipation and kindred ills known as prunol.

Lettsomian Lectures

ON THE

RELATIONSHIP OF DERMATOLOGY TO OTHER BRANCHES OF MEDICINE.

Delivered before the Medical Society of London

BY H. W. BARBER, M.B. CAMB., F.R.C.P. LOND.,
PHYSICIAN IN CHARGE OF THE SKIN DEPARTMENT, GUY'S HOSPITAL.

LECTURE III.*

IN my first lecture I emphasised the close relationship that exists between the skin and the endocrine-autonomic system, and indicated how the latter is to some extent dependent for its normal functioning on the physical stimuli—e.g., light and cool air—that the natural environment of the skin should provide. This relationship is evident again when one studies the conditions which I propose to consider in this lecture, conditions that are *symptoms* rather than distinct diseases. They come within the province of nearly every medical and surgical specialist, as well as of the pathologist, bacteriologist, and biochemist, but they concern no one more intimately than the dermatologists, who, I think I may say, have done much to elucidate their exact pathogenesis.

For the purposes of this lecture I shall divide these conditions or symptoms into two groups :—

Group 1 comprises those that Freeman[1] has labelled the toxic idiopathies.

Group 2 is a triad of cutaneous disorders which are closely related both to each other and to certain maladies that concern the general physician. They are alopecia areata, vitiligo or leucomelanoderma, and scleroderma.

The conditions included in these two groups have this in common, that they are associated with manifest disturbances of the vegetative nervous system and certain endocrine glands. Before considering them in detail, I would insist on one point—namely, the regrettable tendency that still exists of referring to them as if they were *diseases* sui generis, whereas they are merely symptoms, each, it is true, with its own mechanism of production, but of widely different causation in different cases. It is absurd, for example, to talk of a "cure" for asthma or of urticaria, or, for that matter, of alopecia areata and scleroderma; one might with equal justification speak of a "cure" for itching or diarrhœa. Conversely, it is to my mind just as misleading to inform the victims of, say, asthma that there is no certain cure for their disability, for such a statement merely propagates the erroneous idea in the minds of the lay public that asthma is a definite disease of specific causation.

GROUP 1.

The Toxic Idiopathies.

The following list includes at any rate most of the recognised toxic idiopathies :—

Cutaneous.—Urticaria; true infantile eczema; certain forms of eczema occurring after infancy; certain forms of pruritus; prurigo of the Besnier type; prurigo of the Hebra type; prurigo of the simple type; prurigo nodularis; urticaria papulosa (lichen urticatus, strophulus); light-sensitisation of the adult type; dermatitis herpetiformis (probably).

Subcutaneous.—Angeioneurotic œdema.

Respiratory.—Paroxysmal rhinitis, of which hay-fever is one of the commonest examples; asthma.

Gastro-intestinal.—Certain forms of vomiting and diarrhœa; cyclical vomiting.

Nervous.—Migraine; epilepsy (probably).

Articular.—Paroxysmal hydrarthrosis.

I employ the term "toxic idiopathies," coined by Freeman, to describe the various symptoms included in this group, because it conveniently indicates their toxic origin, and implies what we call "idiosyncrasy," which is apparently a striking factor predisposing to their occurrence. By idiosyncrasy in this connexion we mean that certain persons have an inborn tendency to develop hypersensitiveness towards one or more foreign substances, such as animal or plant emanation s, foodstuffs, drugs, &c. Thus only a small proportion of persons develop the hypersensitiveness to certain pollens that betrays itself by the paroxysmal rhinitis we call hay-fever, but many of them are also sensitive to other substances—e.g., foods, drugs, or animal emanations—which may produce different symptoms such as asthma, urticaria, eczema, or diarrhœa. This individual tendency to become sensitised—or idiosyncrasy—is, as is well known, a hereditary and familial trait, and Coca,[2] emphasising the influence of heredity, has suggested the term "atopy," in order to distinguish the basic factor underlying the genesis of the toxic idiopathies from true allergy and anaphylaxis.

Nevertheless, although every clinician recognises this hereditary and familial factor, as Bloch[3] points out, idiosyncrasy is a relative term, and its incidence varies according to the substance or idiosyncrasiogen towards which sensitiveness may develop. According to Coca and others over 60 per cent. of persons are or become sensitive to poison-ivy; Bloch states that 80 per cent. of all adults are sensitive to the round-worm ascaris, and Ancona[4] that all workers with grain, infested with the acarus, *Pediculoides ventricosus*—the cause of so-called grain-itch—eventually develop asthma. Moreover, according to Schittenhelm and Stockinger, all those who constantly handle salts of nickel sooner or later suffer from nickel dermatitis. We thus see the liability to become sensitised by repeated or constant contact with *certain* substances is found in a much greater proportion of persons than can be attributed to individual idiosyncrasy.

Cranston Low[5] succeeded in sensitising his own skin and that of his brother to *Primula obconica*, but failed with six other persons. In Low's case there is a history of asthma on the maternal side, and his mother suffered at one time from primula dermatitis, but in the unsuccessful cases also two had a family history of asthma, and the mother of another had had primula dermatitis.

Only a relative small proportion of those who handle *P. obconica* become sensitised, and there is often a familial idiosyncrasy towards it. Bloch, however, prepared a *concentrated extract* of the plant, and painted with it a small area of the skin of normal persons, including himself. *In every case* he thus succeeded in producing sensitisation of the whole skin, so that subsequent contact with the plant was followed by an acute eczematous dermatitis. As Bloch points out, the importance of this experiment lies in the fact that, by merely concentrating the antigen or idiosyncrasiogen, what is usually regarded as an idiosyncrasy—viz., primula sensitiveness—was transformed into a typical allergy. The experiment is, in fact, exactly comparable to the allergy produced by inoculating tubercle bacilli or certain ringworm fungi, as described in my second lecture. A primary focus was produced at the site of application of the primula extract, from which general sensitisation of the whole skin resulted. Moreover, Bloch was able to produce *focal reactions* in areas of skin to which the extract had previously been applied, but which had healed, on reapplication to other areas.

I think these observations show that the toxic idiopathies, although certainly often familial and hereditary, may, nevertheless, be regarded as allergic in nature. There is a type of person whose life-history may well be said to be one damned idiopathy after another. Often an ichthyotic, his troubles begin with infantile eczema; at about two years of age this may merge into the well-defined variety of prurigo known as the prurigo of Besnier; with this may appear asthmatic symptoms, and sooner or later attacks of urticaria, either of the papular or adult type, or of angeioneurotic œdema develop. Paroxysmal rhinitis, due to pollen, animal emanations, or other antigens,

* Lectures I. and II. appeared in THE LANCET of August 24th and Sept. 7th respectively.

may follow, and acute attacks of eczema, caused sometimes by the skin having become sensitised to plants or chemical irritants, or there may be periodical attacks of vomiting and diarrhœa. Typical migraine may occur in childhood, or succeed some or all of these symptoms in later life.

Such extreme cases are relatively uncommon. It is in them that the familial and hereditary factor is usually most evident, and, although one particular symptom may be traced through several generations —and angeioneurotic œdema is a notorious example of this,—more often the affected members of the same family manifest different symptoms. Moreover, there is every gradation between these rare cases of hypersensitiveness to various antigens, with multiple symptoms of such hypersensitiveness, and the much more numerous cases of idiosyncrasy to one substance only, in which the familial tendency is lacking or uncertain. I always regard myself as practically normal in this respect, and, as far as I know, I have but one such idiosyncrasy—namely, to the human flea—which is not shared by any other members of my family. When I was an extern I was so badly flea-bitten that I became definitely ill with symptoms not unlike those of mild serum sickness. The only similar idiosyncrasy that I have been able to trace in my family is that my maternal grandmother was extremely sensitive to strawberries, but to nothing else.

It is likely, therefore, as Bloch's experiments suggest, that we are all at any rate potentially sensitisable, but that certain persons are much more so than others, and in them the tendency is commonly inherited and transmissible to their children. Probably, as will be seen later, what is inherited is a disordered balance or "make-up" of the endocrine-autonomic system on which this tendency depends; this view is strengthened by the fact that a perfectly normal person, with no inherited predisposition, may, under the stress of an acute or chronic infection, or of a severe emotional shock, develop symptoms of such an endocrine autonomic disturbance, and simultaneously, for the first time in his life, one or more of the toxic idiopathies. I have, for example, seen chronic urticaria, angeioneurotic œdema, the prurigo of Besnier, or asthma, develop suddenly in adults hitherto apparently normal in every way, after acute infection or psychical shock, there being at the same time signs and symptoms of thyroid-adrenal-sympathetic exhaustion.

If, then, we admit that idiosyncrasy is but a relative term, and that we are probably all at least potentially sensitisable, there is no reason to discriminate between the atopy of Coca and allergy, and, personally, I think that the toxic idiopathies may justifiably be considered as allergic reactions, and the cutaneous manifestations of the group be compared, as regards their mechanism of production, to the recognised allergic eruptions such as the tuberculides and trichophytides. With regard to *anaphylaxis*, I agree with Bloch that "the entire process has all the earmarks which dermatologists have learned to regard as characteristic of allergic reactions," and that "only on historical grounds can one understand that some still insist on giving it a special classification, instead of including it under allergy, and stress as particularly characteristic and typical the anaphylactic symptoms of the guinea-pig."

It may be as well at this point to define what we mean by allergy, and I think one of the most comprehensive definitions is that of Bloch:—

"Allergy is that state which has as its basis the property of certain groups of cells (organs) of the living organism to react in a specific manner when brought in contact with a substance, which is, as far as is known, foreign to the organ or cells; the characteristic of this specific pathologic process lies in the fact that it is caused by the reaction of this exogenous substance with its specific cellular fixed antibody. The basis and the essence of allergy is the ability of the living cell to react with the production of specific antibodies to the stimulus of foreign substances, which are, therefore, called antigens, as well as the fact that the contact of the antigen with its specific cellular fixed antibody causes a disturbance of cellular life, which usually results in an inflammatory reaction."

He then goes on to say:—

"It is clear that an organism which possesses or has acquired (by previous contact) such specific antibodies will react to the application of the specific antigen differently from an organism which does not possess such antibodies (allergy = different reaction).

"From this definition other qualities characteristic of the allergic process can be logically deduced. The type and course of the allergic reaction are independent of the nature of the antigen, but vary according to the localisation of the antibody, that is, according to which organ reacts to the antigen. The effect which a substance acting as antigen—namely, through reaction with its antibody, has on the organism is different from the simple pharmacological effect which the same substance has on an organism which does not have any antibodies."

For example, in the case of drugs, such as quinine or iodine, a pharmacological dose, which would be tolerated by a normal subject, would produce violent symptoms in a sensitised person.

In allergy not only are the tissue cells sensitised, but substances—"antibodies," to give them a non-committal term—may be present in the blood, and on them the possibility of active and passive immunisation and of desensitisation depends. Moreover, they enable us in certain cases to determine the substance to which a person is sensitised by means of the Prausnitz-Küstner reaction which has proved so invaluable in the study of allergy. It was employed by A. and M. Walzer[6] in their experimental studies on urticaria, and by it has been established a fact of great importance—namely, that true antigens are not necessarily proteins; in fact, it is probable that in all cases the actual specific antigenic bodies are non-protein substances of relatively simple chemical composition. This has been proved, for example, in pollen hypersensitiveness by Coca and W. Jadassohn, and in sensitiveness to various foods by the latter observer.

Thus in a child with egg-sensitiveness, mentioned by Bloch, a reaction could be produced on the skin of the child as well as on that of a person passively sensitised by the Prausnitz-Küstner method, not only with egg protein, but also with a protein-free dialysate of egg, and W. Jadassohn showed that the actual antigen of the ascaris worm, which provokes violent asthma or urticaria or dermatitis in sensitised persons, is not destroyed by heat and is dialysable; it is therefore not a protein. Moreover, Bloch and Karrer succeeded in preparing from primula plants a pure crystalline substance, with the formula $C_{14}H_{18}O_3$, which, in a quantity of only 0·02 mg., produced a widespread eczematous dermatitis in a sensitised person, characteristic of primula dermatitis.

Now in the various conditions we term the toxic idiopathies we meet with some cases—for example, urticaria from some definite food substance or hay-fever, in which there is specific sensitiveness to one or other pollen,—that are, so to speak, constants. The person has a definite idiosyncrasy, his skin gives a positive reaction to the specific antigen, and his serum will passively sensitise a normal person. The whole phenomenon can be reduced to a relatively simple physiological experiment. But in many cases no such specific sensitiveness can be determined.

Let us take urticaria as an example. We know from the researches of Lewis[7] and his co-workers that the urticarial wheal is provoked by the liberation of a histamine-like substance or histamine itself in the skin, which produces a primary local dilatation of the minute vessels, a widespread dilatation of the neighbouring strong arterioles brought about entirely through a local nervous reflex, and locally increased permeability of the vessel walls. This response may be evoked in certain persons merely by stroking the skin (dermographism); in other cases by the contact of an antigen with sensitised skin cells. It represents a local response to injury, and is presumably a defensive mechanism. But how are we to explain the so-called "psychogenic" urticaria, which certainly occurs? For example, a patient consulted me for

recurring attacks of genuine urticaria and angeioneurotic œdema, which occurred only when he was confronted with an important business appointment, or the prospect of meeting strangers socially. The question of sensitisation can hardly arise here. Are we to suppose that in emotion or anxiety states there may occur a liberation of histamine, such as Lewis has tentatively suggested may be the cause of blushing? In any case, in patients of this type it would seem that there is adrenal-sympathetic insufficiency with relative predominance of the parasympathetic, and that in practically all the toxic idiopathies the anxiety state alone may provoke the paroxysms.

Vagotonia.

Since Eppinger and Hess[8] in 1910 first formulated their conception of vagotonia with its converse sympathicotonia, a great deal of argument for and against their thesis has taken place. The whole question is reviewed in Guillaume's[9] book "Vagotonies, Sympathicotonies, Neurotonies." That one cannot in actual practice sharply divide the vegetative nervous system into its parasympathetic and sympathetic portions is certain. Clinically, however, one does meet with persons in whom there is clearly a disturbance of the normal balance between these two portions of the autonomic system, as well as of the endocrine glands with which they are functionally so closely connected. To dismiss the whole idea as a wild theory, as some would do, is childish, since it is confirmed by pharmacological and other tests.

Persons belonging to Czerny's exudative diathesis —i.e., those manifesting the various toxic idiopathies —correspond more or less to the vagotonic type described by Eppinger and Hess, in which parasympathetic action tends to override that of the sympathetic. Bolten[10] considers that in them there is "a congenital insufficiency of the sympathetic system and of the endocrine glands with accelerator action."

In support of this view is the fact that the various acute manifestations of the exudative or allergic state (like those of anaphylactic or peptone shock) are relieved by adrenalin, and the tendency to their occurrence often lessened by the administration of thyroid, both of which, of course, stimulate the sympathetic; conversely they are aggravated by pilocarpine, which, on the whole, stimulates the parasympathetic.

On the other hand, it is but just to point out that the sweat glands are innervated by the sympathetic, yet pilocarpine, an exciter of the parasympathetic, provokes sweating, and atropine, which paralyses the parasympathetic, arrests it. Moreover, with the approach of death, at which time there is hyposympathicotonia and hypervagotonia, profuse perspiration occurs.

Whether or not, however, one accepts the conception of vagotonia, sympathicotonia, and of Guillaume's neurotonia, which is a sort of mixture of the two, there is no question that in the genesis of the different symptoms of the sensitised or allergic state the endocrine-autonomic system is intimately involved, just as it is in experimental anaphylaxis.

Factors Predisposing to the Manifestations of the Sensitised State or Toxic Idiopathies.

This relationship of the toxic idiopathies to the endocrine-autonomic system is clearly seen if one analyses the known factors predisposing to their occurrence. The principal ones are:—

(1) *Sensitisation to foreign substances*, whereby contact of the antigen with the sensitised tissues results in a train of phenomena, similar to those met with in experimental anaphylaxis, which, like the allergic reactions considered in my last lecture, are doubtless defensive in nature, and are associated with manifest disturbance of the vegetative nervous system. Drury[11] considers that the toxic idiopathies are essentially conservative, self-repairing mechanisms under parasympathetic control. At any rate, as I have said, they are on the whole accompanied by depression of the adrenal-sympathetic action with consequent predominance of the parasympathetic.

(2) *Peripheral irritation.*—This factor, the presence of a so-called reflex source of irritation, may be one of great importance, and is often forgotten. In asthma it is, of course, recognised that a nasal abnormality may be a provoking cause of the attacks by setting up a trigemino-vagal reflex; this is explained by Brodie and Dixon's classical experiments. Similarly, an overloaded stomach, or exposure to strong sunlight may excite the asthmatic paroxysm. The well-known experiments of Donaldson[12] on rectal distension, referred to in my first lecture, are of interest in this connexion. Many of the symptoms produced by an overloaded rectum are clearly the result, not of so-called intestinal toxæmia, but of reflex irritation of the autonomic nervous system, and are promptly relieved when the rectum is emptied. Guillaume[13] records a case of a soldier with various symptoms of the vagotonic state, including migraine-like headaches. He was found to have a small piece of shrapnel embedded in the left orbit, removal of which caused the entire disappearance of all his symptoms. Eyestrain, a painful tooth, and a misplaced uterus are other examples of peripheral sources of irritation that may provoke symptoms of sympathetic disturbance out of all proportion to their apparently trivial nature.

(3) *Psychical stimuli.*—I need not enlarge upon the influence of emotion, worry, and shock in precipitating or aggravating the symptoms of the allergic state. The work of Cannon, Crile, and others on the psychical factor in disturbances of the thyroid-adrenal-sympathetic system is well known, and has been admirably reviewed by Langdon Brown[14] in his Croonian Lectures on the Sympathetic Nervous System.

These three factors have been utilised by Hurst[15] and by Langdon Brown[16] to express asthma in a formula. The former has defined asthma as due to an irritable condition of the bronchomotor portion of the vagus nucleus, which causes it to react unduly to psychical or peripheral stimuli, or to foreign proteins in the circulating blood; under one or other of these stimuli there result bronchial spasm, and, as Langdon Brown suggests, vasomotor turgescence of the bronchial mucous membrane.

In toxic idiopathies other than asthma the same three factors may be operative, and this accounts for the fact that those who suffer from them fall, as Freeman[17] points out, into the hands of different specialists in turn—for example, the immunologist, the rhinologist, the dermatologist, the neurologist, the psychologist, the gastro-enterologist, and so on. Each has his own point of view, his own line of treatment. These patients, more than any others, provide the handle of accusation against specialism, and at the same time demand of their consultants a range of knowledge wider, I am afraid, than they usually obtain.

(4) There is yet a fourth factor which may, I think, when still further investigated elucidate much that is obscure—namely, the metabolic factor. Oriel,[18] working in my clinic, has shown that certain definite biochemical changes occur in the blood and urine before, during, and after the paroxysms or crises of allergic manifestations. It would appear that in true anaphylactic shock, in serum sickness, in the shock following extensive burns, and in the toxic idiopathies, such as asthma, hay-fever, urticaria, angeioneurotic œdema, migraine, cyclical vomiting, infantile eczema, and certain forms of prurigo, what may be called the biochemical formula is much the same. In the acute crises—e.g., an attack of urticaria, angeioneurotic œdema, migraine, or asthma—there is a definite cycle of changes in the blood and urine corresponding to the preparoxysmal, paroxysmal, and post-paroxysmal periods, and in chronic cases, such as in the prurigos or persistent urticarias, this cycle is repeated, the biochemical findings varying according to the exacerbations or remissions of active manifestations.

These investigations are being pursued both in patients and by animal experiments with promising results, but in the present state of our knowledge the difficulty of evaluating the influence of the metabolic

factor is to decide to what extent the biochemical changes found are *the result* of the allergic reaction, and to what extent a metabolic error predisposes to their occurrence.

James Adam,[19] and following him, Haseltine,[20] La Forge[21] and others, have emphasised what they term the toxic factor in asthma, and have shown clearly that many chronic asthmatics may be entirely relieved of their symptoms after an initial treatment of detoxication by means of purgation and the promotion of diuresis and diaphoresis, followed by suitable dietetic rules and insistence on regular outdoor exercise. The same is true in the case of other idiopathies, such as urticaria, angeioneurotic œdema, and the prurigo of Besnier, which is so often accompanied by asthma. Moreover, even in cases of such specific sensitiveness as hay-fever, treatment along these lines may bring about a cessation of the attacks, in spite of exposure to the particular pollen to which the patient is susceptible.

The truth of this contention of Adam and his followers is beyond all question, and may be summed up by saying that, even in patients hypersensitive to a known specific antigen, freedom from active manifestations of such hypersensitiveness can, at any rate in some cases, be obtained by putting the patient under conditions ideal for the development of physical fitness, in spite of his being still exposed to the antigen to which he is sensitised. This is illustrated perhaps most strikingly in patients who are the allergics par excellence—namely, those belonging to the ichthyosis-asthma-hay fever-eczema-prurigo-urticaria syndrome, in whom there is hypersensitiveness to several antigens and multiple symptoms of allergy. If such a person live a completely out-of-door life in suitable surroundings with adequate exercise, combined with judicious heliotherapy, his symptoms disappear as soon as he attains a certain degree of physical fitness; his whole appearance is transformed, he may eat foods with impunity which formerly provoked one or more of his symptoms, and he can handle animals without risk, contact with which previously gave him asthma or attacks of paroxysmal rhinitis. In some cases, as is well known, the mere removal of such a patient from his home surroundings to hospital is sufficient to cause his symptoms to disappear, and, in spite of deliberately exposing him to antigens to which he is sensitised, it may be impossible to make them reappear. On the other hand, a return to his home and his former mode of life, or an emotional upset, may at once cause him to revert to his *status quo ante*. I do not for a moment believe that this effect of a change of surroundings is always due, as some would have us believe, to the patient being sensitised to antigens, such as moulds, dusts, and so on, present in his home; it may be true in a few cases, but in the majority it is not so. In some no doubt the effect is chiefly psychical, in others it is due to the restoration of the metabolic functions to normal.

Unquestionably the treatment par excellence for these allergic patients is, as I have said, to put them under conditions which are most favourable for the proper working of their purely animal functions. In the artificial environment of urban civilisation they are unable to adapt themselves to their surroundings either psychically or physically, and this maladaptation would seem to be partly due, as Bolten suggests, to an inborn insufficiency or hypotonia of the sympathetic and of the accelerator endocrine glands, chiefly the adrenals and thyroid; both their metabolism and their endocrine-autonomic balance is disturbed.

As regards metabolism, the biochemical investigations referred to suggest that it is in the detoxicating functions of the liver that the clue to the problem lies; it would seem, in fact, that this is true both with substances reaching the liver viâ the alimentary tract, and with those introduced parenterally. For example, in the case of metallic drugs such as the arsenical, bismuth, or gold compounds, we know that tolerance of them is largely a function of the liver, and that intolerance may be sometimes prevented by administering glucose in sufficient quantity to ensure an adequate supply for glycogen formation which, as Roger[22] insists, is essential for the antitoxic and detoxicating hepatic functions. I think that the liver may be regarded as the first line of defence, and, when this breaks down, I believe the skin takes on a vicarious protective function, as represented by the various cutaneous manifestations of allergy.

Group 2.

Alopecia Areata, Vitiligo, Scleroderma.

These three conditions form a closely-linked triad, since they not only frequently occur together, particularly alopecia areata and vitiligo, but because all three are often met with in association with diseases of the endocrine-sympathetic system—for example, Graves's disease. The literature concerning them is enormous, but all that need now be said is that the sum total of the clinical and experimental observations published concerning them leads one inevitably to the conclusion that they are all due to involvement of the autonomic nervous system and the associated ductless glands. Nevertheless, the exact mechanism of their production is entirely obscure, and, when one attempts to formulate theories, one is met at once with apparently contradictory facts. For example, scleroderma, as the late Dr. Castle[23] pointed out in his exhaustive review of its literature, occurs so frequently in association with thyroid disorders that there must be a relationship between the two, yet it is found both in Graves's disease and in myxœdema. Dittisheim[24] observed scleroderma in eight cases of Graves's disease out of seventeen, yet the peripheral and generalised form—sclerodactyly—is usually accompanied by symptoms of Raynaud's disease, acroasphyxia, and hypothyroidism. I shall content myself by comparing the three conditions as regards certain features they possess in common, and then briefly deal with each in turn, and record some personal observations upon a few cases.

(1) *All three may occur in a localised and in a generalised form.*—Thus in the majority of cases of *alopecia areata* one or a few asymmetrical patches are found on the scalp or beard region, but in others the loss of hair may become generalised and involve the entire body. *Vitiligo*, though usually extensive and bilaterally symmetrical, may be localised to one area. *Scleroderma*, like alopecia areata, commonly occurs in patches—*morphœa*. Much rarer is the diffuse form, but the pathological changes would seem to be essentially the same, and the two forms may be met with simultaneously or at different periods in the same patient.

(2) *All three may occur in the so-called "band" form.*—Thus *alopecia areata* may rarely be seen to follow more or less the course of the supraorbital nerve, and Sutton[25] has seen it thus succeed an attack of supra-orbital herpes zoster. *Vitiligo* and more often *scleroderma* may also have this "band" distribution. Queyrat and Leri,[26] and Leri and Lamy,[27] have described cases in which both vitiligo and scleroderma were present, followed a zoniform or pseudo-root distribution, and were associated with spina bifida. Hutchinson[28] long ago described cases of scleroderma affecting the distribution of the fifth nerve, and compared it to herpes zoster. Anderson[29] reported a case of scleroderma involving the whole distribution of the right fifth nerve. Alterations were observed not only in the skin, but also in the mucous membranes supplied by the nerve, including the conjunctiva. Moreover, the hair fell out on the same side as high as the middle of the vertex. Sequeira[30] has recorded two cases of scleroderma corresponding in distribution to the first and second divisions of the fifth nerve, and O'Donovan[31] one in which the first and third were affected. Castle also described one in which the first and second divisions were involved. Presumably in these cases the changes in the skin are due to involvement of certain postganglionic sympathetic fibres coming from the superior cervical ganglion, and reaching the skin and mucous membranes of the face via the

Gasserian ganglion and the divisions of the fifth nerve.

(3) *In the ætiology of all three conditions one or more of the three factors that are known to affect the endocrine-autonomic system—namely, infection, reflex irritation, and psychical trauma—appear to be of paramount importance.*

Alopecia Areata.

If one reviews the discussions that have for years centred around the ætiology of alopecia areata, one finds that there have been two main antagonistic theories—the parasitic and trophoneurotic. While the majority of dermatologists accept the latter, there are still some who cling to the former, at any rate in certain cases. Jacquet spent the best part of his life in seeking to prove the non-contagiousness of alopecia areata, and to establish the trophoneurotic view. The epidemics of it that have been reported can be explained partly, as Sabouraud[32] has pointed out, owing to an error in diagnosis between the bald patches following contagious impetigo and true alopecia areata, and partly owing to the occurrence in institutions or schools of one or a few cases of the latter, and the unconscious or deliberate production of bald patches by pulling out the hair (as in trichotillomania) on the part of other children, in order to excite the interest, and perhaps obtain the exemption from work accorded to the genuine cases, as in the epidemics reported by Haldin-Davis.[33]

It has, however, always been a mystery to me how anyone, apart altogether from clinical observations on the evolution and associations of alopecia areata, could possibly entertain the parasitic theory of its causation after a careful study of the remarkable series of changes that constitute the life-history of a patch from its beginning to its final recovery. I can only briefly summarise the most important points:—

(1) A patch of alopecia areata appears suddenly by the fall of a tuft of hair. In the early stages there is capillary dilatation, so that the patch is pinker than the surrounding skin. Sabouraud has described this erythema occurring as a sort of "pre-alopecia roseola" before the fall of hair. In older patches, on the other hand, the colour is paler than the unaffected skin. This initial erythema is common to alopecia areata, scleroderma, and vitiligo. Lévy-Franckel and Guillaume[34] have described changes in the capillary circulation of alopecia areata and vitiligo, as observed with the capillaroscope, which they consider characteristic of sympathetic nerve involvement. It is possible that, as Wright[35] suggests in a recent paper, the fall of hair in alopecia areata is due to interference with the vascular supply of the hair.

(2) Years ago Sabouraud noted that one of the earliest histological changes in alopecia areata is a disturbance of pigmentation at the site of the affected hair papillæ. There is what Besnier termed a pigmentary ataxy—i.e., hyperpigmentation of one part with depigmentation of another, exactly comparable to that which occurs in vitiligo.

(3) This redistribution of pigment is clearly seen in the so-called "exclamation-mark" hairs, which are for practical purposes the hall-mark of alopecia areata. More than any other feature, I think they give us the clue to the immediate cause of this variety of alopecia.

The exclamation-mark hair is usually from 4 to 6 millimetres, occasionally a little over a centimetre, in length; the proximal portion is thinned from atrophy, devoid of pigment, and ends below in a white "dry" bulb, represented by the dot of the exclamation mark; the distal portion is relatively thickened, club-shaped, and deeply pigmented. Sabouraud[36] has shown very clearly how this exclamation-mark hair is formed. If one pulls out a number of dead hairs from the border of an actively spreading patch of alopecia areata, and examines them microscopically, the majority will be found to differ in no way from those that fall after an acute infection, but a few, which would have become exclamation-mark hairs, will show us how these are formed.

At one or more points along the shaft of the hair the strands will be seen to become dissociated, exactly as in trichorrhexis nodosa, and at these points the hair cracks; below the fracture one sees the hyperpigmented bulbous end of the exclamation-mark hair, and proximal to this the atrophied, depigmented part terminating in the dead bulb. I wish particularly to emphasise:—

(*a*) The redistribution of pigment whereby the part near the root becomes depigmented, the bulbous end hyperpigmented—the pigmentary ataxy, which characterises vitiligo, already referred to

(*b*) The atrophy of the hair, which does not occur in parasitic infections such as ringworm.

Now of the affected hairs on a patch of alopecia areata, only a few take on the exclamation-mark form, the rest fall entire, atrophied and depigmented near the bulb, but without going through the exclamation-mark stage.

The real significance of the exclamation-mark hairs is that, apart from alopecia areata, they are met with, so far as I know, only in two other conditions—namely, after epilation with the X rays, and by the internal administration of thallium acetate. The loss of hair in alopecia areata, after X rays, and as a result of thallium acetate, is practically identical in type, and due to *inhibition* of the function of the hair-forming papillæ. The majority of the hairs fall suddenly and completely, but some, more resistant, perhaps, in the case of alopecia areata and thallium alopecia, or which have not received quite the full dose of X rays, go through the exclamation-mark stage.

It is probable that the epilatory action of X rays, as well as the trophic changes in the skin that excessive dosage may produce, are due to their action on the sympathetic nerve-supply of the hair and skin, or of their blood-vessels. It is certain that this is the action of thallium. Wadia, working with Dixon,[37] has shown that the effects of thallium are due to its action on the autonomic system; it diminishes the resistance of the sympathetic nerve-cells to various stimuli—e.g., to the Faradic current. Its action is more marked on the sympathetic than on the parasympathetic. Like so many drugs, it has a double and contrary effect; it destroys the existing hair, but also in small doses stimulates new growth. This accounts for the fact that, after thallium epilation, regrowth of the hair occurs much more rapidly than after X ray epilation.

As Dixon suggests, this action of thallium on the hair, so similar in its objective results to the phenomena observed in alopecia areata, affords an additional argument in favour of the sympathetic nerve origin of the latter. Histologically the loss of hair produced by thallium acetate is found to be due to failure of the process of transition from the large polygonal cells to the stratified cells forming the hair. It is clear, therefore, that this transition, which represents really the process of keratinisation, is under the control of the sympathetic, either directly or through the medium of the blood-supply.

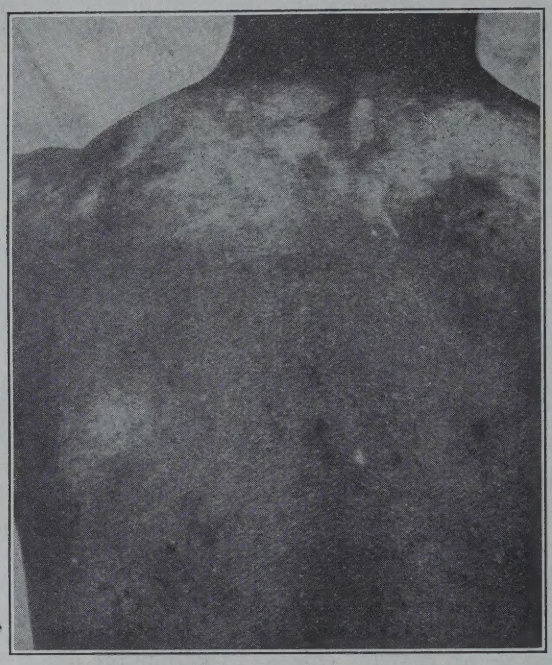
When we come to consider the ætiology of alopecia areata from data afforded by *clinical* experience, we are struck by one significant fact, that two at least of the factors I mentioned as predisposing to the toxic idiopathies clearly also come into play here—viz., peripheral irritation and psychical stimuli; a third factor—acute or chronic infection—might perhaps be included under sensitisation to foreign substances. Moreover, familial or hereditary tendency to alopecia areata, if not so striking a feature as in the toxic idiopathies, is, nevertheless, common enough to exclude the possibility of mere coincidence (22 per cent. according to Sabouraud).

I will briefly review the above factors:—

(1) *Peripheral irritation.*—Jacquet,[38] whose inspiration and imagination were in advance of his time, attributed alopecia areata to a constitutional or hereditary dyscrasia, as revealed by biochemical analyses, combined with a central or peripheral source of nervous irritation (*pelades centrales et pelades réflexes*). He noted the association of alopecia areata

with carious teeth or the eruption of wisdom teeth, and unhealthy conditions of the nasopharynx. Whitfield[39] published many years ago a series of cases, associated with eyestrain and headaches, in which

FIG. 1.



Showing vitiligo of the shoulders associated with the lesions of pediculosis.

correction of the error of refraction led to rapid recovery. Pernet had previously suggested eyestrain as a possible cause, and I have had a few cases which confirm this. Goodwin Tomkinson[40] has pointed out the not infrequent association of alopecia areata and strabismus. I think that there is not the slightest doubt that a peripheral source of reflex nerve irritation is causal in certain cases.

(2) *Psychical stimuli.*—There is general agreement concerning the importance of the psychical factor in many patients with alopecia areata, and numerous cases have been recorded in which a definite shock immediately preceded its onset. The most significant example of this in my own experience was a patient who has had three separate attacks, from each of which she recovered; the first was after her mother's death, the second two years later when her father died, and the third, in which I saw her, followed immediately upon the death of a sister.

(3) *Infection.*—It is eight years since, with Zamora, I[41] published a series of cases illustrating the apparent association of long-standing cases of alopecia areata with chronic focal infection, and shortly after this I developed a patch myself following an acute antral infection and a period of rather intense nerve strain. Subsequent experience has led me to believe that an acute or chronic infection is a frequent predisposing factor, though by no means an invariable one. This is only to be expected in view of the influence of infection on the sympathetic nervous system and on the endocrine glands, particularly the adrenals and thyroid.

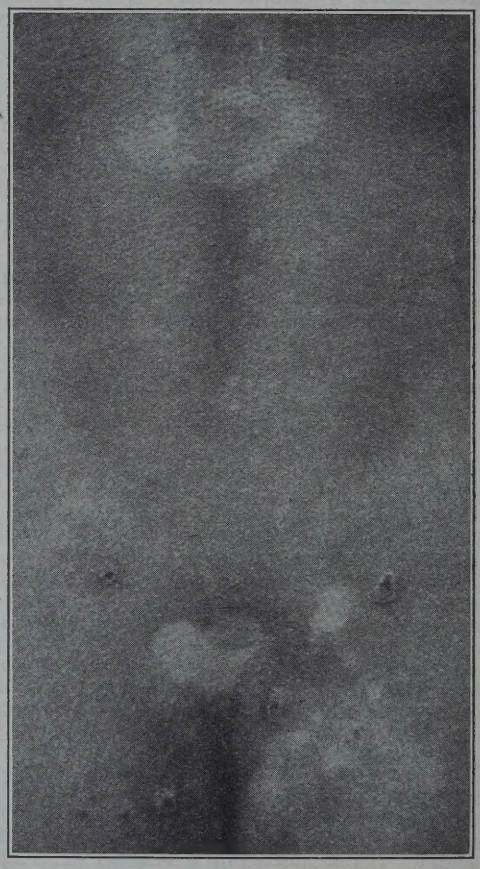
Vitiligo.

Sabouraud, among others, has insisted on the probable rôle of hereditary and less commonly acquired syphilis in the ætiology of alopecia areata, and certainly his published cases are striking. In France hereditary syphilis is emphasised as a factor in various conditions associated with symptoms of endocrine-sympathetic disorder far more than in this country; personally, I think that the French overestimate and that we underrate its importance. In vitiligo, however, the association with acquired or inherited syphilis in some cases is more striking, the pigmentary change being accompanied by changes in the cerebro-spinal fluid indicative of meningeal involvement. Brown, Dujardin, and van Haecke[42] published a series of such cases among soldiers. Moreover, vitiligo is not very uncommon in tabes. I have also seen two cases with the subacute combined degeneration of the cord that accompanies pernicious anæmia. I have already referred to the cases in which vitiligo may be localised, like alopecia areata and scleroderma, to a definite area corresponding to a pseudo-nerve-root distribution—for example, in association with spina bifida occulta.

As might be expected in view of the intimate relationship of the two conditions, clinically one finds the same predisposing factors apparent in vitiligo as in alopecia areata.

(1) *Peripheral irritation.*—During the war I was able to collect several cases of vitiligo appearing for the first time in men with long-standing pediculosis corporis. As is well known, intense generalised pigmentation is often a feature of this parasitic infection, and may be accompanied by an asthenia that renders the clinical picture strikingly like that of Addison's disease; moreover, Greenlow, Besnier, Thibierge, Darier, and others have observed pigmentation in the mouth in severe pediculosis. Presumably, therefore, the venom of the louse, or, perhaps, the

FIG. 2.

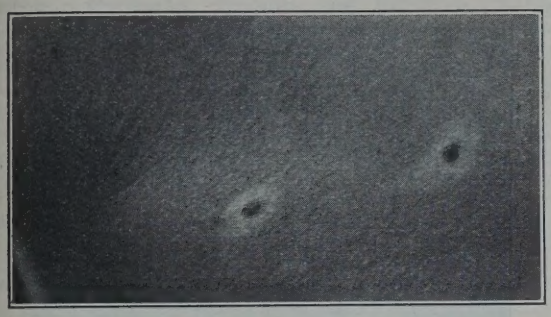


Similar lesions on the buttocks.

long-standing peripheral irritation, may profoundly affect the adrenal-sympathetic system, hence the Addisonian pigmentation, the asthenia, the dry, harsh skin, and the cachexia. In some cases, as I have said, instead of a generalised pigmentation,

vitiligo may result, and the distribution of the leucodermic patches tends to correspond to the sites of election of pediculosis—viz., the shoulders, sacral region, and thighs, but may become widespread.

FIG. 3.



Showing vitiligo developing around small pigmented moles in the left scapular region.

This is shown in Figs. 1 and 2. It is of interest in this connexion that Dore has noted a group of cases of *alopecia areata*, in which severe and long-standing irritation from pediculosis capitis preceded the loss of hair.

(2) *Psychical stimuli.*—The sudden development of vitiligo after a severe nervous shock or accident has, as in alopecia areata, been frequently recorded; Gougerot has emphasised this factor. It was evident in a case to which I shall shortly refer.

There is one feature of vitiligo of great interest, which has not to my mind received sufficient attention, and that is its association with pigmented moles. Sutton,[43] in 1916, reported two cases in which the leucodermic patches surrounded small moles, and christened the condition leucoderma acquisatum contrifugum; in the same year I collected several cases, and also noted the frequency of large pigmented nævi in patients with vitiligo. Figs. 3 and 4 illustrate these two points.

To discuss the full significance of this association would involve a consideration not only of the whole question of cutaneous pigmentation, including Bloch's classical work on the subject, but also that of the origin of nævi, more particularly of the type nævus unius lateralis, of which there are various forms.

Masson, in his recent researches, concludes that the cells of pigmented nævi are of nervous origin. Gutmann and Dalsace have described a case of diffuse unilateral pigmented nævus in which there was evidence of involvement of the orthosympathetic on the affected side—e.g., arterial hypotension, diminution of sweating, and exaggeration of the oculo-cardiac reflex. The pseudo-radicular distribution of the nævus and these signs suggest a malformation localised to the sympathetic nerve centres of the right side of the spinal cord. Similar observations were made by Laignel-Lavastine and Tinel in a vascular nævus unius lateralis.

It would seem that vitiligo is more likely to occur in persons naturally hyperpigmented, and particularly in those who possess large or numerous pigmented nævi.

I will now briefly describe a case in which experiments carried out by Prof. M. S. Pembrey and J. C. G. Dickinson in my clinic seem to indicate involvement of the sympathetic.

The patient came under my care in 1924 for a generalised vitiligo. She gave a long history of repeated attacks of tonsillitis, and in 1914 had three patches of *alopecia areata*. The tonsils were removed in 1916, shortly after which her husband wrote to her from France to say that he had no intention of returning to her. This news produced a serious nervous breakdown, and was followed within a few weeks by the appearance of an extensive *vitiligo*. In 1923 she had an alveolar abscess, and an acute otitis media; 14 teeth were extracted for pyorrhœa. In the same year patches of lupus erythematosus appeared on the hands and feet.

Investigations.—Wassermann reaction negative. Blood pressure 105/74. Test-meal complete achylia. *Loewi's adrenalin eye test positive* on two occasions.

Visible sweating, induced by a hot cradle on three occasions, took place on the non-pigmented, but not on the pigmented areas; on one occasion, however, some sweating of a pigmented area was evoked. But in a case of Addison's disease, with exophthalmic goitre and vitiligo, recorded by Burgess and Warner, in which the hot-air bath alone did not cause sweating, the injection of pilocarpine produced uniform sweating on both dark and light areas of vitiligo.

Other tests with pilocarpine, exposure to ultra-violet light, &c., were performed in my case, and Prof. Pembrey came to the conclusion that the vitiligo was associated with definite sympathetic nerve involvement.

A point of great interest in this case was that, while under observation in hospital, an *erythematous patch.* developed on the right thigh, which gradually became transformed into an area of depigmentation and one of hyperpigmentation, the edge delimiting the two remaining pink for some considerable time. This suggests that, as in alopecia areata and scleroderma, there is in vitiligo a pre-erythematous stage before the redistribution of pigment occurs. The combination of alopecia areata and vitiligo, the long story of repeated infections, the signs and symptoms of adrenal-sympathetic exhaustion, and the dramatic onset of the vitiligo after psychical shock were the striking features in this case.

FIG. 4.

Showing vitiligo of the back in the neighbourhood of a large pigmented nævus on the right loin.

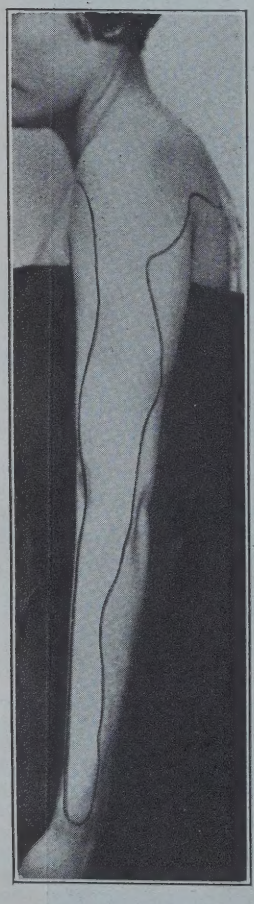
Scleroderma.

I have already referred to certain points of similarity and inter-relationship between scleroderma, alopecia areata, and vitiligo, and cannot here enlarge upon them. I will refer merely to a case of scleroderma (morphœa) involving the left arm and shoulder, associated with muscular wasting and an apparent involvement of the brachial plexus.

This patient, a girl of 24, was sent to me by Dr. C. P. Symonds, and was subsequently investigated by Dr. G. C. Millis. She had superficial patches of scleroderma involving the area shown in Fig. 5.

They were surrounded by the usual "lilac ring," and had begun, according to her own statement, as "red patches." At the same time there was wasting of the muscles of the shoulder-girdle (Fig. 6), particularly of the deltoid and the supra- and infra-spinatus. The patient had complained for some time of pain, chiefly of a "dragging" character, above the left clavicle and in the shoulder extending down the arm. There was seen a definite fullness in the left supraclavicular region, and palpation revealed a soft, ill-defined swelling, the nature of which could not be determined. On X ray examination there was no evidence of cervical rib nor any other bony abnormality, and no opacity in the soft tissues distinct from the surrounding structures. The Wassermann reaction was negative. In view of the distribution of the muscular wasting and of the sclerodermatous change in the skin, Prof. T. B. Johnston was asked to see the patient, and he thought that anatomically the condition suggested a lesion of the brachial plexus, no doubt connected with the supra-clavicular swelling.

FIG. 5.



A case of scleroderma, showing the area of left shoulder and arm superficially involved.

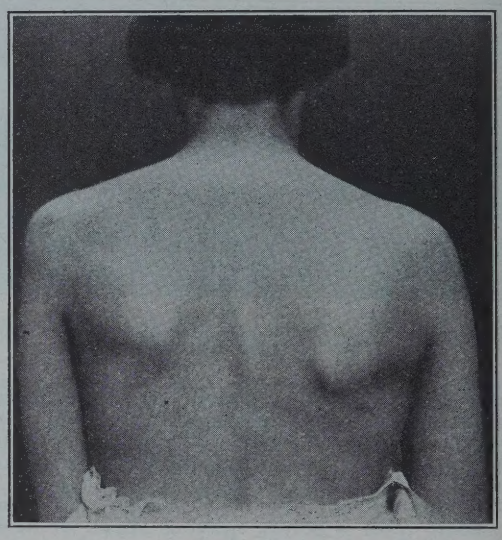
Dr. Millis gave the patient an injection of pilocarpine, which produced rather severe symptoms of collapse with profuse sweating, *but the area of the skin involved by the scleroderma exhibited no sweating*, thus suggesting involvement at any rate of the sudoral nerves in this area.

In this case, therefore, there would seem to have been an involvement of the left brachial plexus of unknown character, associated with partial atrophy of certain muscles, chiefly those supplied by the fifth and sixth cervical nerves, and scleroderma of the skin over the deltoid and supra-scapular regions extending down the outer border of the arm to the wrist. I have seen two other cases, both in females, of scleroderma combined with muscular wasting.

I am afraid I have given a very incomplete review of the evidence in favour of the connexion between alopecia areata, vitiligo, and scleroderma and disturbances of the endocrine-sympathetic system, but the literature of these conditions is rich in confirmatory evidence upon which I have not touched. So far as our knowledge goes at present it would seem that the normal process of keratinisation in the epidermis which is disturbed in ichthyotics, the formation of the hair, the control of pigmentation, and what may be vaguely termed the normal nutritional processes in the skin, which is upset in scleroderma, apart from the secretion of the sweat and sebum and the cutaneous circulation, are all under the control of the endocrine-sympathetic nervous system. No doubt there are different groups of sympathetic nerve-cells and fibres controlling these various functions.

In alopecia areata, vitiligo, and scleroderma we meet with cases in which the disturbance is localised and

FIG. 6.



The same case, showing wasting of the left shoulder-girdle.

in which it can be connected with a definitely regional area of nerve involvement. Such cases I have mentioned, and they are of paramount importance in establishing my thesis. In other cases the three conditions are more or less generalised, and it is then that we find as a rule symptoms not of local nerve lesion, but of a widespread disturbance of the endocrine-sympathetic system as a whole, such as Graves's disease, simple hyper- or hypo-thyroidism or pituitarism, Addison's disease, profound post-infectional or emotional exhaustion, &c.

Clinically we find that it is just those factors which are known to affect the sympathetic and the endocrine glands, that so often obtrude themselves upon our notice in alopecia areata, vitiligo, and scleroderma—viz., heredity and familial influences, psychical shock, worry or nerve-strain, acute or chronic infections, and peripheral sources of reflex irritation. We can understand that just as a local lesion, such as spina bifida or a meningo-myelitis, might lead to involvement of the sympathetic nerve cells or fibres controlling one function—e.g., sweating or pigmentation, so a general cause, such as an infection, may have a similar selective action.

CONCLUSION.

The title I chose for these lectures, "The Relationship of Dermatology to other Branches of Medicine," affords so wide a scope that I could without difficulty have prepared another series dealing with aspects of the subject upon which I have not touched at all. I have tried, however, throughout to emphasise one fact—namely, the great importance of the skin as a vital organ, both in health and disease. An appreciation of this is, I believe, gradually gaining ground; nevertheless, ignorance of the most elementary principles of the physiology and pathology of the skin is, it must be admitted, widespread among our profession. I believe this to be due partly to the fact that dermatology has been practically ignored in the qualifying examinations, and partly to faulty teaching of the real significance of cutaneous disorders and eruptions in relationship to general medicine. One does not wish to increase the task of the already over-burdened student, but it seems to me that he might profitably spend more time studying the surface changes in the skin and accessible mucous membranes, indica-

tive of metabolic errors or "the beginnings of disease," and be reasonably excused much irrelevant matter.

The ten years that I have passed in active dermatological practice since the war have taught me chiefly the following lessons: (1) First and foremost, the fundamental importance of making an accurate diagnosis. (2) To consider all possible *external* factors,—traumatic, irritant and infective,—before approaching the question of internal predisposing causes; this lesson I have learnt from bitter experience. (3) The importance of a complete routine examination of one's patients, and the folly of accepting the findings of others. (4) The value of urinary examination in specimens taken at different times of the day in gauging the metabolic functions of a patient. (5) The influence of acute or chronic infections in the ætiology of banal cutaneous eruptions. (6) The growing importance of the psychological factor in dermatology, as emphasised by O'Donovan and others. (7) The influence of hereditary and familial tendencies. (8) Lastly, to consider the habits, mode of life, and surroundings of one's patients, and to determine to what extent they can be modified, in order to approach as nearly as possible those demanded by a healthy animal.

If dermatologists have become more and more indebted to the expert knowledge of other specialists, from the anatomist to the psychologist, I like to think that to some extent the debt is mutual.

I wish to acknowledge the invaluable help and criticism given to me in the preparation of these lectures by Dr. T. Izod Bennett.

REFERENCES.

1. Freeman, J.: Proc. Roy. Soc. Med., 1920, xiii., 129; and THE LANCET, 1920, ii., 229.
2. Coca, A. F.: Arch. Path. and Lab. Med., 1926, i., 96.
3. Bloch, B.: Arch. Derm. and Syph., 1929, xix., 175.
4. Ancona, C.: Il Policlinico (sez. med), 1925, xxxii., 161.
5. Low, R. Cranston: Anaphylaxis and Sensitisation, Edinburgh, 1924, p. 176.
6. Walzer, A. and M.: Arch. Derm. and Syph., 1928, xvii., 659.
7. Lewis, T.: The Blood Vessels of the Human Skin and their Responses, London, 1927.
8. Eppinger, H., and Hess, L.: Die Vagotonie, Samml. Klin. Abhandl. von Noorden, Berlin, 1910, Nos. 9 and 10.
9. Guillaume, A. C.: Vagotonies, Sympathicotonies, Neurotonies, 2nd ed., Paris, 1928.
10. Bolten, G. C.: Ueber Genese und Behandlung der Exsudativen Paroxysmen, Berlin, 1925.
11. Drury, E. G. D.: Med. Jour. South Africa, 1921, xvii., 66 and 74.
12. Donaldson, A. N.: Jour. Amer. Med. Assoc., 1922, lxxviii., 884.
13. Guillaume, A. C.: Vagotonies, Sympathicotonies, Neurotonies, 2nd ed., Paris, 1928, p. 293.
14. Brown, W. Langdon: The Sympathetic Nervous System in Disease, London, 1920.
15. Hurst, A. F.: THE LANCET, 1921, i., 1113.
16. Brown, W. Langdon: Physiological Principles in Treatment, 5th ed., London, 1924, p. 425.
17. Freeman, J.: THE LANCET, 1928, i., 288.
18. Barber, H. W., and Oriel, G. H.: Ibid., 1928, ii., 1009 and 1064.
19. Adam, James: Asthma, 2nd ed., London, 1926.
20. Haseltine, B.: Amer. Med., 1927, xxii., 545.
21. La Forge, A. W.: Ibid., p. 568.
22. Roger, H.: Presse Méd., 1922, xxx., 145.
23. Castle, W. F.: Brit. Jour. Derm. and Syph., 1923, xxxv., 255, 303.
24. Dittisheim: Ueber Morbus Basedowii, Basel, 1895, Inaug-Dissert Zurich.
25. Sutton, R. L.: Diseases of the Skin, 6th ed., St. Louis, 1926, p. 1045.
26. Queyrat, L., and Leri, A.: Bull. de la Soc. Franc. de Derm. et de Syph., 1921, xxviii., 116.
27. Leri, A., and Lamy, L.: Ibid., No. 3, March, 1923, xxx., 127.
28. Hutchinson, J.: Arch. of Surg., 1890, iii., 29; and 1892, x., 357.
29. Anderson, W.: Brit. Jour. Derm., 1898, x., 46.
30. Sequeira, J. H.: Ibid., 1911, xxiii., 40.
31. O'Donovan, W. H.: Ibid., 1915, xxvii., 377.
32. Sabouraud, R.: Entretiens Dermatologiques, Paris, 1924, p. 36.
33. Haldin-Davis, H. D.: Brit. Jour. Derm. and Syph., 1922, xxxiv., 162.
34. Lévy-Franckel, A., and Guillaume, A. C.: Bull. de la Soc. Franc. de Derm. et de Syph., 1925, xxxii., 144.
35. Wright, C. S.: Arch. of Derm. and Syph., 1929, xix., 365.
36. Sabouraud, R.: Entretiens Dermatologiques, Paris, 1924, p. 64.
37. Dixon, W. E.: Proc. Roy. Soc. Med., 1927, xx., 1197.
38. Jacquet, L.: Ann. de Derm. et de Syph., 1900, i., 696.
39. Whitfield, A.: Skin Diseases and their Treatment, 2nd ed., London, 1921, p. 273.
40. Tomkinson, J. Goodwin: Brit. Med. Jour., 1924, ii., 518.
41. Barber, H. W., and Zamora, A. M.: Brit. Jour. Derm. and Syph., 1921, xxxiii., 1.
42. Brown, W. H., Dujardin, and van Haecke: Ibid., 1919, xxxi., 1.
43. Sutton, R. L.: Jour. Cut. Dis., 1916, xxxiv., 797.

A STUDY IN ENCEPHALITIS.

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THE following study deals with 28* cases of non-epidemic encephalitis, the outstanding features of which were agitation and depression. In all of them a post-mortem examination showed either active inflammation or the effects of antecedent inflammation in the region of the basal ganglia, and a gliosis not confined to the region of the basal ganglia. In six cases the gliosis in the frontal region had become so extreme as to give the appearance of a tumour formation with hæmorrhage.

Encephalitis, apart from the epidemic or lethargic variety, has been known for many years. The frequency of its incidence to-day has not met with general recognition, first because of the predominance of the epidemic variety, and secondly because the clinical manifestations are so indeterminate. The connexion between pancreatic deficiency and agitated melancholia or its milder manifestation, the anxiety neurosis, has been known since 1923. This work, which was done at Bethlem Royal Hospital, London, was based upon the surface tension readings of the serum and is supported by the blood-sugar observations of Farran-Ridge, Mann, and others, as well as by the post-mortem examinations and the clinical results obtained by treatment. Recent observations appear to show that this abnormal blood state is an immunity phenomenon and that such cases are liable to low-grade infections and inflammations which are often but not necessarily bacterial. Many cases of *Bacillus coli* infection and some of furunculosis show this abnormal blood condition. A majority of such cases of agitated melancholia have proved on microscopic examination to be cases of encephalitis. As a result of these observations the question arose whether or not the relation between encephalitis and pancreatic deficiency is constant. Without exception all the cases of encephalitis investigated showed corresponding pancreatic changes. Observation of a series of cases of encephalitis of different types leads to the conclusion that so long as the surface tension range of the serum remains abnormal the encephalitis is still active. Further facts pointing to the connexion between pancreatic deficiency and encephalitis are the increased sugar in the cerebro-spinal fluid, in encephalitis, and the frequency of diabetes—generally in elderly relatives—in the families of encephalitics. It is worthy of note that encephalitic patients very seldom pass sugar and that none of the cases investigated actually had pancreatic diabetes.

CASE 1.—Clergyman, aged 23, was admitted on March 30th, 1927. He had always been in good bodily health, except for partial blindness for three months in 1923 and diphtheria in 1926. In October, 1926, he became depressed and feared insanity, after which he suffered from restlessness, failure to concentrate, ideas of persecution and self-accusations of immorality. He left home and was found by the police wandering in London. He was taken to Moorcroft where he became violent and made a vigorous attempt to castrate himself. He was transferred to Bethlem, where he revealed auditory hallucinations but no memory defects. He was quiet and took his food. Under treatment with Secretogen he improved greatly, lost the confusion and began making plans for his future. Then there was rapid deterioration, he became restless and confused again, his memory failed, he became violent and noisy, his heart sounds were poor and his heart dilated. He weakened rapidly and died on July 20th, 1927.

Pathological and Post-mortem Findings.

Urine.—April 4th, 1927. Deposit of oxalates and stellar phosphates.

Blood.—April 11th. Wassermann and van den Bergh reactions negative. Surface tension range: 42·5 to 41·5 dynes.

* Of the cases mentioned, seven have been selected for publication to show the diversity of types affected and the variability of the clinical picture in this condition.

Certified Cause of Death.—(1) Heart failure, (2) lobar pneumonia. The pia and arachnoid mater were found opaque over the vertex. The pancreas was hard and pale; microscopically it showed patchy fibrosis with normal areas, and swelling of the lining of the ducts with cellular denudation. Sections of the brain showed an increase of glial elements and marked engorgement of the smaller vessels with perivascular exudation. These conditions were especially noticeable in the region of the basal ganglia.

CASE 4.—Clerk, aged 46, was admitted on Nov. 5th, 1927. The patient was always in good health. After his discharge from the army it was noticed that if upset he had sudden outbursts of temper. On Sept. 15th, 1927, he was sick at his office and vomited. He went home and was treated for "flu." He was restless during the night from then on. There was reversal of the sleeping habit and he refused food. There is a history of his having been treated for a large carbuncle on the neck in 1917. On admission his physical examination showed general muscular weakness and anæmia and signs which suggested organic disease in the central nervous system. The pupils were unequal, irregular, and sluggish. There was a positive Romberg sign. He was indifferent, spent most of his time huddled up on his bed, and sometimes wandered aimlessly about the ward. His replies to questions were inaccurate and irrelevant. There was a definite nominal aphasia. His memory for recent and remote events was defective. His emotional reaction was one of happy indifference. His thought-content and emotional reaction were in complete disharmony. He was thought at first to be a case of general paresis because of his acute confusional state with aphasia and other physical defects, all of which suggested an organic reaction. After the examination of the blood and cerebro-spinal fluid on Nov. 11th, however, he was treated for pancreatic insufficiency. He died on Nov. 24th.

Pathological and Post-mortem Findings.

Urine.—Nov. 8th. Specific gravity 1032, alkaline; heavy deposit of phosphates but no albumin, sugar, acetone, pus, or renal casts. Nov. 23rd: Acid with a trace of albumin. Deposit of about 2 per cent. pus cells. The pus cells showed no change. Chlorides 0·71 per cent. Nov. 23rd: Chlorides 0·79 per cent.; contained 550 cells per c.mm. practically all red cells.

Blood Urea.—Nov. 23rd. 48 mg. per 100 c.cm. Urine urea 3 per cent. Ratio 1:60. On these figures the slight rise in cerebro-spinal chlorides between Nov. 11th and 23rd would be accounted for by meningeal irritation.

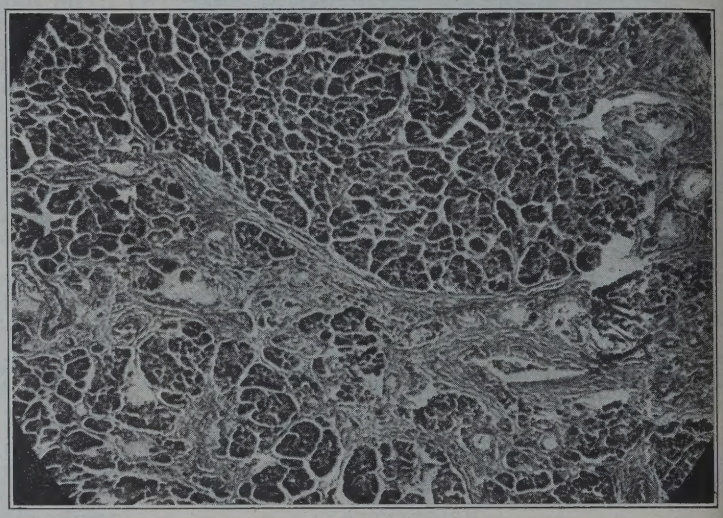
Certified Cause of Death.—(1) Subacute encephalitis; (2) respiratory failure.

The dura mater was injected with blood and the veins and sinuses were dilated. The pia and arachnoid were red and injected and were thick and opaque in places. The convolutions were lead-coloured with marked injection. A large tumour was found in the right frontal lobe. Sections presented exactly the same conditions as in Case 1. The pancreas was red and injected but otherwise normal to the eye. Under the microscope, sections showed increase of fibrous tissue—very marked in places—with many areas of hæmorrhage into the substance.

FIG. 1 (Case 10).

Glioma in the frontal region. Engorgement of basal ganglia.

FIG. 2 (Case 10).



Pancreas in same case as Fig. 1.

CASE 8.—Tobacco merchant, aged 64, was admitted on Sept. 21st, 1926. He was said to have been a hard-working, quiet man who enjoyed fairly good health. He was subject to influenza and there was a history of diabetes in the family. He was sent to Bethlem Royal Hospital after he had fallen nine feet from a window on to a lawn. He suffered only slight cuts, but was dazed, agitated, and confused. His clinical notes state that he had retired from business six months before on doctor's orders because of anxiety. Investigation by his son showed losses. His son stated that at times he had made "hare-brained schemes for business development." On admission he was in fair condition. His pulse-rate was 64 and regular. There were no murmurs. There were a few moist sounds in both lungs. He became very depressed and said everyone had deserted him, and seldom spoke. There was no history of delusions or hallucinations. There is a question whether he showed reversal of the sleeping habit. His depression and agitation increased. After being treated with Secretogen as a result of showing diminished surface tension range he improved mentally and physically. This improvement was maintainned from Nov. 14th, 1926, until April 2nd, 1927, when he showed a temperature of 97·6°, and a pulse-rate of 120, and a respiration-rate of 30. In the lungs were signs of basal œdema. The abdomen was retracted (he had vomited) and there were signs of an old hemiplegia. Digitalin was given but he died the same night.

a small Gram-positive diplococcus and a slender Gram-negative bacillus.

Blood.—Nov. 11th. Wassermann reaction negative. Surface tension range 45 to 45·5 dynes (on Nov. 23rd, 45 to 45 dynes). Van den Bergh reaction positive.

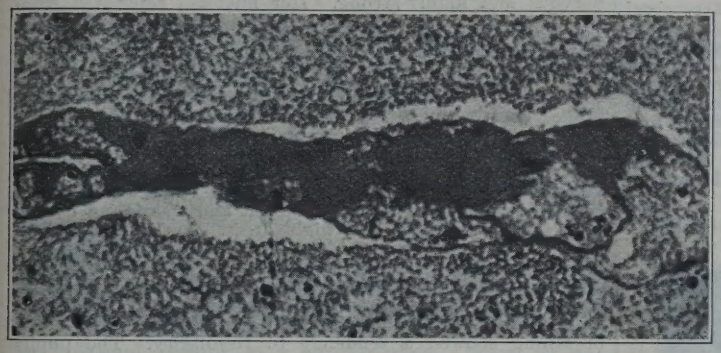
Cerebro-spinal Fluid.—Nov. 11th. Wassermann reaction negative; Noguchi reaction positive; colloidal gold test,

Pathological and Post-mortem Findings.

Urine.—Sept. 22nd. Specific gravity 1022, alkaline, deposit of phosphates, and trace of sugar, but no albumin, acetone, pus, or renal casts. Oct. 22nd: Specific gravity 1034, alkaline, deposit of phosphates, but no albumin, sugar, acetone, pus, or renal casts.

Blood.—Oct. 7th. Wassermann reaction negative.

FIG. 3 (Case 10).



Thrombus in brain in a case of encephalitis.

Nov. 12th: Wassermann reaction negative; surface tension range 43·5 to 41·5 dynes.

Certified Cause of Death.—(1) Broncho-pneumonia and heart failure; and (2) arteriosclerosis.

The pia and arachnoid were somewhat œdematous, and slightly opaque. The liver was dark and bile-stained. Both kidneys were red. On section the pyramids were indistinct and the cortex irregular. The capsule was adherent. Sections from the brain showed exactly the same conditions as in Case 1. The pancreas was soft. Sections showed marked fibrosis.

CASE 10.—Station-master, aged 60, was admitted on Jan. 26, 1925. He was said to have enjoyed fairly good health. Fifteen years before his final breakdown he had what was then diagnosed as a "nervous breakdown" of some months' duration and was treated at home. Eight months before his admission he began to complain of forgetfulness and inability to concentrate. After a month he took a vacation and stopped work for five months. On his return he found things still more difficult and was forced to resign absolutely. He then began to complain of severe and almost continuous headaches. On admission his left pupil was fixed and the right pupil gave a just perceptible flicker. Both pupils reacted to accommodation. He was depressed and agitated. These moods seemed to depend on the severity of the headache. His conversation was largely inconsequent and his memory for both recent and remote events was poor. His reflexes were normal with the exception of the pupils and the bladder, which showed considerable leakage before micturition. A week after admission he became hallucinated, noisy, and restless. On sedatives he became apathetic, incoherent, and faulty in his habits. His pulse-rate was 100 and regular. His temperature was 97°. On Feb. 5th his pulse-rate went to 120 and then dropped to 70. He was then semi-conscious. His temperature was subnormal. On Feb. 7th, 1925, he suddenly collapsed. His pulse became feeble and his breathing shallow, and he went into a state of coma. He died the same day.

Pathological and Post-mortem Findings.

Urine.—Jan. 27th. Specific gravity 1012, amphoteric reaction, deposit of phosphates; no albumin, sugar, acetone, renal casts, or pus. Feb. 5th: Specific gravity 1010, urea 1·1 per cent., acid, a few granular casts, and leucocytes; a trace of albumin, but no sugar or acetone.

Cerebro-spinal Fluid.—Feb. 5th. No lymphocytosis. Colloidal gold test, no change. Noguchi reaction definitely positive (no blood). Feb. 7th: No lymphocytosis. Noguchi test definitely positive. Colloidal gold test, no change. Wassermann reaction negative.

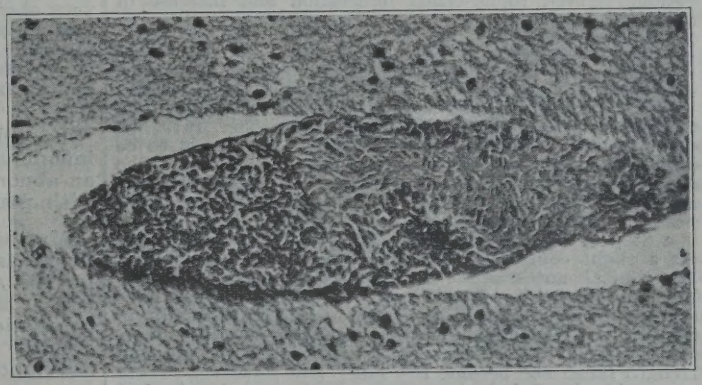
Blood.—Feb. 5th. Urea, 22 mg. per 100 c.cm. Ratio to urine urea 1 : 50. Feb. 7th: Wassermann reaction negative. Surface tension range 45·5 to 46 dynes; repeated, 45 to 45 dynes.

Certified Cause of Death.—(1) Encephalitis lethargica; and (2) respiratory failure.

The pia and arachnoid were normal but congested. The convolutions showed large effusions of blood over the right frontal pole and other small areas on the left temporal region. The liver was fatty. The kidneys were pale, with narrow cortex and no distinction between the cortex and the pyramids. On section a large glioma was seen in the right frontal region. Sections of the brain showed exactly the same conditions as in Case 1. The artery to the pancreas was blocked by a calcareous patch. There was softening of the body and the tail was hard and white. Sections showed extensive areas of fibrosis.

CASE 21.—Secretary, aged 38, was admitted on Dec. 16th, 1922. He was a well-educated and highly intellectual man, brought up with narrow Nonconformist views. He became a solicitor but after a "religious upheaval" he threw up the law and took up Y.M.C.A. work. He married at 28 and was looked upon as a very competent and capable man. He was sent to India just before the war and held a prominent post in the Y.M.C.A. there. Owing to the war he had to remain in India, where he worked continuously until his health broke down in 1921, and eventually he was sent back to England early in 1922 with dysentery and malaria. He was treated by Castellani and made a good recovery, and by August, 1922, he began to take up his work again. In November he undertook a lecture tour in Ireland, where he had one or two attacks of "influenza," which did not, however, incapacitate him. On Dec. 14th he received a telegram in Dublin saying that his mother had pneumonia, and he returned to London at once. He was met at the station by his brother with the news that she was dead, and he became emotional. His wife took him to a hotel, where the emotional disturbance increased, and during the night he became hallucinated, excited and confused. On Dec. 15th he was seen by Castellani, who pronounced him free from malaria and dysentery, and also by Sir F. Mott, who could find no neurological signs. The excitement persisted, he became noisy and violent, and he was admitted to Bethlem the following day. On admission he was well nourished and in good muscular condition. His heart was dilated and his pulse-rate 160. There were no murmurs. The apices of both lungs were dull and the bases congested. The pupils were pinpoint and reacted to light. Mentally he was in a state of acute toxic delirium. It was impossible to obtain his attention. He was restless, noisy, shouting meaningless words and phrases, and incontinent. He required tube-feeding. No physical signs presented themselves, though he occasionally showed a slight rise of temperature to not more than 100°. He wasted rapidly and the delirium subsided, until by the seventh day it was possible at times to keep his attention momentarily, but he never became properly accessible. He died suddenly on Dec. 24th, 1922.

FIG. 4 (Case 21).



Organising thrombus in vessel of brain.

Pathological and Post-mortem Findings.

Urine.—Dec. 19th. Specific gravity 1080, acid, a trace of albumin, and a deposit of uric acid. No sugar, acetone, renal casts or pus.

Cerebro-spinal Fluid.—Dec. 22nd. No lymphocytosis. Noguchi test gave definite flocculence. The Wassermann

reaction was negative and the colloidal gold test showed no change.

Blood.—Dec. 22nd. Wassermann reaction negative. Serum strongly anticomplementary. Moderate leucocytosis, of fourteen thousand, and marked vacuolation of the red corpuscles. No definite malarial parasites could be found. Urea in urine 2½ per cent., equals 2500 per 100 c.cm. Urea in blood 72 mg. per 100 c.cm. (fever). Ratio 30 : 1. Ratio in nephritis 10 : 1. Average blood-urea 40 mg. in 100 c.cm.

Brain Sections.—Dec. 28th. There is no evidence of malaria.

Certified Cause of Death.—(1) Cerebral œdema; (2) cerebral hæmorrhage; and (3) cardiac dilatation.

The veins and sinuses of the head were congested. The pia and arachnoid were very congested over the whole of the vertex. On the right side there was a subpial hæmorrhage about 2 inches in diameter, spread over the surface of the hemisphere. Sections showed the vessels dilated and thrombosed. There were many small hæmorrhages and perivascular infiltration. The neurologia was increased and there was chromatolysis of nerve cells. Sections from

FIG. 5 (Case 25).

Extensive fibrosis and increased nucleation of the pancreas.

the basal ganglia showed exactly the same condition as in Case 1. The pancreas was normal to the naked eye. Sections showed round-celled infiltration and increase of interlobular tissue.

CASE 25.—Spinster of 52 was admitted on April 9th, 1920. The patient, a publisher's clerk, had had a nervous breakdown at the age of 21 and was treated at home, making a good recovery. She had never been very strong since then, suffering from bronchitis frequently. In October, 1919, she began to be very depressed and fearful. She feared to be alone. She slept very badly and wept frequently. She went into her past life and spoke with tears of many misdeeds. She was admitted to Bethlem as a voluntary boarder. Her mental condition at the time was marked by a deep depression and some agitation. Physically there was a slight cough and a marked tremor of both hands. Her clinical notes after her admission speak of many delusions, chiefly of unworthiness. It was necessary to have her certified shortly after admission. She failed rapidly in every way. Her depression and agitation became worse, and she was very resistive and noisy. As her physical strength failed she became less noisy and resistive. There was rapid physical degeneration. In five weeks she lost 14 lb. She died rather suddenly on Sept. 8th, 1920.

Pathological and Post-mortem Findings.

Urine.—August 27th. Specific gravity 1018, acid. No albumin, sugar, or casts. Deposit of epithelial debris. Sept. 2nd: Specific gravity 1020, acid. Deposit of uric acid, but no albumin, sugar, or casts. Sept. 8th: Specific gravity 1016, acid; a few hyaline casts, and some mucus, but no albumin or sugar, and no blood in spectrum.

Certified Cause of Death.—(1) Hæmorrhagic pancreatitis.

There was excess of cerebro-spinal fluid and œdema over both parietal regions. The liver showed considerable fibrosis, and the spleen was small and very firm. The kidneys showed some congestion. Both suprarenals showed an abnormal narrowness of the cortex. Accessory suprarenals were numerous and prominent. Sections of the brain showed exactly the same conditions as in Case 1. The pancreas was shrunken, with multiple hæmorrhagic areas. Sections showed dense masses of fibrous tissue throughout the gland. There were large smooth empty cavities (fat necrosis) and very little normal tissue remained. The vessels were thickened and thrombosed.

CASE 26.—Married woman of 50 was admitted on May 19th, 1928. She had two children: a boy of 14 and a girl of 16. She was said by her husband to have been always nervous and highly-strung. Her husband separated from her ten years before her death because of her temper and a sex-habit to which she was addicted. In 1920 she was operated on for floating kidney and appendicitis, and made a good recovery. In 1923 she complained of extreme physical exhaustion and depression. She was treated medically at home and recovered some measure of strength. In February, 1928, she again complained of great weakness and was forced to stay in bed. She could not sign her name and gradually began to ramble in her speech. She was then very irritable, depressed and agitated. Three weeks before admission she left her home at night and was found by the police wandering in her night-dress. As there was no improvement, she was admitted to Bethlem as a voluntary boarder on May 19th, 1928. Physically she was in a very poor condition, with sickly pallor of the face and cyanosis of the lips. There were no heart murmurs. The blood pressure was 114–72 and the heart-sounds were weak. Her breathing showed a tendency to tubularity. The pupils did not react well to light. Her abdomen was rigid in the left and right iliac regions owing to prolonged constipation. She was drowsy for long periods, lying in an almost comatose state. She could be readily roused, when for a few moments she answered questions intelligently. She then rambled in her speech. There was marked confusion, and disorientation was complete in all spheres. The drowsiness was enhanced by bilateral ptosis. During her eleven days in hospital there was no mental change. Physically she failed very rapidly. On May 29th her temperature reached 105°. She was quite comatose and breathing rapidly. There was a patchy broncho-pneumonia. She died on May 30th, 1928.

Pathological and Post-mortem Findings.

Urine.—May 23rd. Specific gravity 1012, amphoteric and light cloud of albumin. Deposit of pus, but no sugar, acetone or renal casts.

Blood.—May 24th. Wassermann and van den Bergh reactions negative. Surface tension range 48·5 to 46 dynes.

Cerebro-spinal Fluid.—May 30th. No lymphocytosis (10 per mn. 3). Noguchi test positive. Colloidal gold test 0012332100,0 (meningitic type). Chlorides 0·68 per cent. at the highest (below normal).

Certified Cause of Death.—(1) Heart failure; (2) broncho-pneumonia; and (3) encephalitis.

The pia and arachnoid were engorged and the convolutions very red. There was no excess of cerebro-spinal fluid. The liver showed some fibrosis. The vessels of the brain were very obvious on section. The colour of the white matter was darkened to a pale buff. Sections presented exactly the same features as in Case 1. The pancreas was normal to the naked eye. Sections showed increase of fibrous tissue—very marked in places—with areas of hæmorrhage into the substance.

Encephalitis, therefore, appears to be a low-grade inflammatory process which occurs in persons with an abnormal blood serum and is always associated with pancreatic deficiency.

My thanks are due to Dr. J. G. Porter Phillips, the physician-superintendent of Bethlem Royal Hospital, for his advice and help in the preparation of this paper, and to the Governors of the institution for permission to work in their laboratory. My thanks are also due to Dr. C. Lovell and his staff for their assistance.

THE SUNDERLAND HOSPITALS.—The Monkwearmouth and Southwick Hospital, at Sunderland, is to be removed to another site, the present building being almost entirely surrounded by a factory. The new hospital will provide more than 100 beds—nearly double the present number—with facilities for extension. The cost is estimated at £100,000. Sunderland Royal Infirmary is also in course of enlargement. Princess Mary last year opened the block named after her, and the second part of the scheme, the building of pathological and bacteriological laboratories, is now being started. Next will come an administrative block which will cost £40,000, and is expected to be completed within the next 12 months.

THE INDUCTION OF INFLAMMATION IN THE TREATMENT OF MALIGNANT AND OTHER LOCAL DISEASES.

By HAROLD BURROWS, C.B.E., F.R.C.S. Eng.

Bernhardt and Strauch[4] state that intravenous injection of isamine-blue reduces the rate of growth and decreases cachexia in certain cases of inoperable cancer. While trying to find a vital dye specific for cancer cells, and following their work, I found that isamine-blue, given intravenously or intraperitoneally, sometimes stained grafted tumours growing in the flanks of rats and mice. At first it seemed as though isamine-blue might have some degree of special affinity for malignant cells, but subsequent experience showed that isamine-blue, when administered during life, collects in inflamed tissues so as to make them a pronounced blue, while the normal tissues—with the exception of the liver and perhaps other components of the reticulo-endothelial system—remain quite unstained. Other colouring matters become localised in inflamed tissues in a similar way. Some of the preliminary observations which led to a recognition of this fact are as follows :—

(1) A mouse was given an intraperitoneal injection of 0·3 c.cm. of a 0·5 per cent. solution of isamine-blue in normal saline. Post-mortem examination six days later revealed some small patches of blue in the omentum, deep staining of the axillary and anterior mediastinal glands (such as would be expected after an intraperitoneal injection of the dye), and pronounced staining of the tissues immediately surrounding a parasitic cyst of the liver. No prominent blue coloration was present in any other tissue.

(2) An old albino rat was given an injection of 2 c.cm. of a 0·5 per cent. solution of isamine-blue in normal saline into the left femoral vein. Four hours later the rat was found to have died of hæmorrhage from the punctured vein. Post-mortem examination showed a striking blue coloration of the cæcum, which was the seat of a relatively large non-malignant ulcer.

(3) A rat with an ulcer below the jaw was given a similar intravenous injection of isamine-blue. On the following day the cutaneous edges of the ulcer were stained a distinct blue.

(4) On several occasions it was noticed that when injections of isamine-blue were given to rats who were suffering from scabies of the ears, the dye became localised in the zones of inflammation, each little nodule becoming blue.

(5) When dyes were injected into the femoral vein the groin was epilated, the rats were anæsthetised, the skin of the groin was disinfected with methylated spirit and lysol or with methylated spirit alone, an inguinal incision was made, the femoral vein was exposed, and the drug was injected into it, the wound was closed with a single stitch, and a final disinfectant was applied. Special care was taken to prevent any escape of the dye into the field of operation. In spite of these precautions a varying degree of staining of the epilated skin was repeatedly observed, and in cases where the small wound did not close by primary union the edges of the open wound were stained blue.

(6) Similar observations were made when trypan-blue was used ; the following is a particular instance. An old albino rat which happened to be suffering from otitis media was given an injection of 3 c.cm. of a 0·5 per cent. solution of trypan-blue into the left femoral vein. Three days later the skin of the right side of the face was swollen and stained blue and the right eye was protosed.

From these and similar observations it was concluded that isamine-blue and trypan-blue, when injected into the peritoneal cavity or directly into the blood stream, have a special tendency to become deposited in tissues which are inflamed. Numerous experiments were subsequently carried out to test this general conclusion, the purpose being to produce a local inflammation and then to observe if a drug injected into the peritoneal cavity or into the blood stream would accumulate in the artificially inflamed area.

The following methods of causing inflammation were employed :—

(1) *Application of Chemical Irritants to the Skin.*—Epilation of a small area in the right flank or of a right limb was effected with sodium sulphide, and a swab wet with methylated spirit or chloroform was then kept applied to the epilated area while the drug to be tested was injected into the left femoral vein. The localisation of dye in the inflamed skin in these rats was definite, though usually not intense ; but the inflammation of the skin was only mild.

(2) *Injection of an Irritant Beneath the Skin of the Right Flank of a Normal Rat before the Intravenous Injection of a Dye.*—The irritants used were Coley's fluid, sterile agar-agar (1 per cent. solution in distilled water), neutral gum (5 per cent. solution in distilled water), kaolin suspended in 5 per cent. solution of gum in distilled water, and kaolin suspended in distilled water. Turpentine and chloroform were also tried, but hypodermic doses of either of these drugs in amounts as small as 0·1 c.cm. caused the death of the animal almost immediately (i.e., in three of the four animals used. In the survivor no localisation of dye occurred at the site of injection of the chloroform). Coley's fluid did not appear to cause much, if any, inflammation in mice, but some success attended its use in rats. Of the reagents tried, agar, which was suggested to me by Dr. Piney, appeared to be the best, and the others were discarded. A 1 per cent. solution in distilled water sets as a jelly at the ordinary temperature of the laboratory. Nevertheless, even in this state, it can be drawn up through a medium-sized serum needle and injected by a hypodermic syringe. The usual amount given to rats was 1 c.cm.

(3) *Injection of sterile irritants (usually 1 per cent. agar-agar) into grafted tumours growing in the right flank*, followed by intravenous or intraperitoneal administration of the drugs to be tested.

(4) *Application of diathermy to the thigh of a non-tumour-bearing rat shortly after an intravenous injection of trypan-blue* (one experiment only).

The drugs tested for localisation in these experiments were, with the exception of India ink, chiefly vital dyes, and included India ink, trypan-blue, trypan-red, isamine-blue, Congo-red, water-blue, erythrosin, proflavine, and safranin.

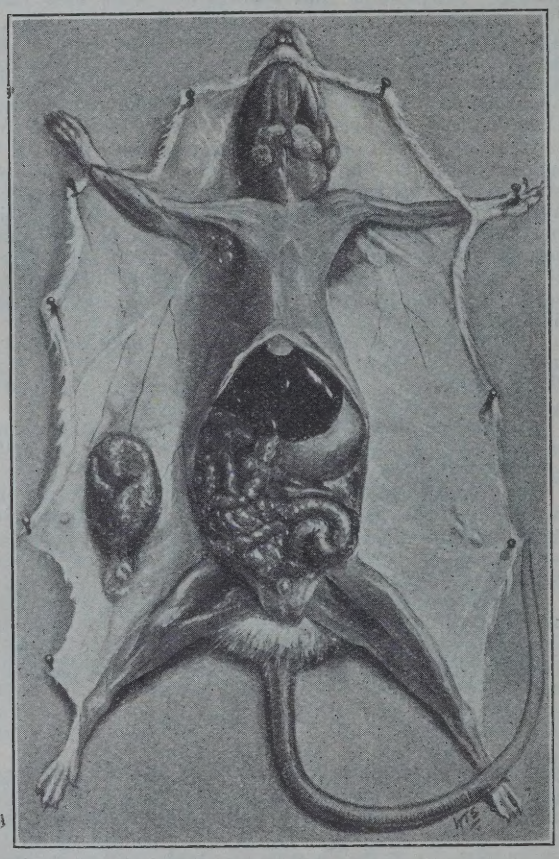
It was found that to get the best results an interval must be allowed between the injection of the agar and the intravenous administration of the drug to be tested. Poor results were obtained if this interval was shorter than two hours, and usually two and a half to three hours or more were allowed to elapse. With peritoneal injections of dye the inflammatory agent may be injected at the same time. The liver in particular has such an avidity for India ink and dyes, and fixes them so securely, that unless the inflammation induced by the agar has reached a sufficiently advanced stage by the time that the dye is circulating in the blood little or no dye will be available for the inflamed tissue. With intraperitoneal injections the passage of the dye into the blood stream is a slow process, and if the dye be injected by this route and the agar be given subcutaneously at the same time, the agar will have had time to produce a sufficient grade of inflammation before the major part of the dye has entered the blood stream.

Results.

Localisation of the colouring matters used in the inflamed tissues was strongly manifest with trypan-blue, trypan-red, water-blue, and isamine-blue, and it was definite also with Congo-red and India ink. With erythrosin, proflavine, and safranin the experiments were performed once only and the results were indefinite. Diathermy was used as the inflammatory (vasodilating) agent in one experiment only. A young rat was anæsthetised and an injection of 1·2 c.cm. of a 0·5 per cent. solution of trypan-blue in normal saline was made into the left femoral vein. Twenty minutes later the right thigh was submitted for three minutes to a diathermy current. On the following day, when the rat was killed, the tissues of the right thigh in the region treated by diathermy had become stained a uniform, pronounced blue. There was some evidence that the current used had been greater than would be desirable for therapeutic purposes. However, the problem is about to be further investigated with the collaboration of Mr. W. V. Mayneord.

In view of the possibility of treating malignant disease by setting up inflammation in the tumour and so causing it to retain a therapeutic remedy, a careful observation was made of the axillary lymphatic glands of the animals whose grafted flank tumours had been impregnated with colouring matter under the influence of inflammation. But it was found that the dyes were so firmly fixed in the tissues which had been inflamed that the axillary lymphatic glands remained free or nearly free from coloration.

It is possible that if a growth were destroyed by this method the disintegrating products, including the therapeutic agent itself, would ultimately drain away



Rat with a J.R. sarcoma growing in right flank. One c.cm. of 1 per cent. agar-agar was injected into the tumour, and at the same time 1·5 c.cm. of 0·5 per cent. trypan-blue were injected into the peritoneal cavity. The dye has become concentrated in the inflamed tumour.

by the lymphatic system and so bring the lymphatic extensions of the original growth under the influence of the remedy. Whether such a process will occur remains to be proved. At any rate the experiments conclusively show that an inflamed tissue can hold and retain various colouring matters circulating in the blood against the competition of the liver and the reticulo-endothelial system generally. In therapeutic practice this competition can be largely eliminated by applying the remedy immediately to the inflamed tissue, either by direct injection into the tissue or into its artery of supply.

General Discussion.

This retention by living, inflamed tissues of certain substances conveyed to them in the blood is clearly a therapeutic principle of very great importance, and it has also a direct bearing on physiology and pathology. The fact itself is not entirely new. Lister and others of his time demonstrated that an inflamed tissue could collect and retain the white blood cells, and within the last 20 years inquiries have been made into the dissemination of infective organisms when injected into experimental animals. It has been shown that the organisms, very quickly after their introduction into healthy tissues, appear in the appropriate lymphatics and in the blood stream; whereas if the injection of organisms is made into tissues which are already inflamed the dissemination is retarded or prevented.

In 1924 E. L. Opie [1] showed that certain antigens introduced into a normal rabbit diffuse widely in the tissues, enter the blood stream, and appear in the urine, while the same substances injected into a sensitised animal are fixed at the site of injection and do not get into the blood (cf. Arthus's reaction). G. Spagnol [2] found that if colloidal mercuric sulphide were injected into the auricular vein of a rabbit while a pad of cotton-wool soaked in chloroform was applied for 15 seconds to the animal's side, a sharp black stain of the sulphide was found in the subcutaneous connective tissue under the chloroformed spot when the rabbit was killed—after two hours or eight days. A corresponding experiment on a guinea-pig, using trypan-blue instead of mercuric sulphide, showed a similar deposition of the injected material beneath the area of skin to which chloroform had been applied. Valy Menkin,[3] in a valuable paper recently published, has reported some experiments which demonstrate beyond doubt the fixation of trypan-blue when injected into inflamed tissues. He injected it into the forelegs of rabbits and collected the lymph returning from the treated area by inserting a capillary pipette into a subclavian lymphatic vessel. He found that when trypan-blue was injected subcutaneously into the foreleg of a normal animal the dye readily appeared in the lymph flowing from that leg. But if an inflammatory agent (5 per cent. aleuronat with 3 per cent. starch in 0·5 per cent. saline solution) was injected subcutaneously into the leg an hour or so beforehand, a subsequent injection of trypan-blue into that leg was not followed by the appearance of the dye in the lymph. Menkin mentions an experiment by Opie in which the latter found that a preliminary aseptic peritonitis set up by aleuronat prevents, after an interval of 24 hours, the dissemination of hæmolytic streptococci injected into the peritoneum.

From remote times until to-day clinicians have used therapeutic measures of which the effectiveness can be explained by the principle now advanced. For example, the remedial effects of setons, blisters, cauterisations, counter-irritations, poultices, hot fomentations, active and passive congestion, and sterile fixation abscess may be attributed at least in part to the capacity of inflamed tissues for removing from the blood stream the agents and noxious products of disease. Sunburn and the pigmentation of scars, the disappearance of micro-organisms from the blood stream in the most active stage of typhoid fever, and many other phenomena can be accounted for by inflammatory fixation.

Summary.

(1) Inflamed tissues have the capacity for collecting and retaining many substances carried by the blood stream or injected locally.

(2) If inflammation be caused in any part requiring treatment medicaments can be concentrated in that part and so prevented from damaging healthy organs.

(3) There is reason to suppose that a large variety of remedies may be supplied in a form suitable for use by this method.

I have to thank Prof. A. Leitch, Director of the Research Institute of the Cancer Hospital, who provided facilities for this work. Dr. E. L. Kennaway has been kind enough to suggest and supervise throughout, and the outcome of this experimental inquiry is largely due to him. Dr. A. Piney has given me helpful advice on several occasions. To these, to Mr. W. V. Mayneord, and to the laboratory attendants I am glad to acknowledge my indebtedness.

The work has been carried out at the Research Institute of the Cancer Hospital, London, under a

grant from the British Empire Cancer Campaign, for whose assistance I wish also to express my gratitude.

References.

1. Opie, E. L.: Jour. Exper. Med., 1924, xxxix., 659.
2. Spagnol, G.: Atti. Accad. Lincei, 1928, viii., No. 10, 515.
3. Menkin, Valy: Jour. Exper. Med., 1929, l., 171.
4. Bernhardt, H., and Strauch, C. B.: Z. Krebsforschung, 1928. xxvi., 361.

FACTORS IN FOOT RECONSTRUCTION.

By C. HOPE CARLTON, M.Ch. Oxf., F.R.C.S. Eng.,

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In considering the mechanics of the foot I have had the help of Mr. L. N. G. Filon, F.R.S., Professor of Applied Mathematics at University College. After examining the bones of the leg and foot he wrote as follows:—

"Removal of the astragalus might be expected to give better lateral stability than fusing the tarsus, since in astragalectomy the malleoli will engage the bones on the tarsus which lie immediately below. When the foot is dorsi-flexed in paralysis with weak calf muscles, then removal of the astragalus with posterior displacement would help mechanically, since dorsi-flexion is reduced first by the removal of bone at the fulcrum, and, secondly, by the greater mechanical advantage with which the calf muscles now act. When the deformity is that of plantar flexion, then anterior displacement would be desirable to enable the dorsi-flexors to act with greater advantage, or as an alternative, a stop must be produced to prevent plantar flexion beyond a right-angle."

It is satisfactory to find clinical experience agreeing with the deductions of a mathematician who was examining the bony skeleton for the first time.

I next sought the opinion of a consulting engineer as to whether such a mechanism as the tarsus occurs in any engineering system. Miss Verena Holmes, a member of the Institute of Mechanical Engineers, and of the Institute of Marine Engineers, says:—

"The arrangements of the muscles and bones in the foot and leg are not analogous to any engineering device within my experience. The engineer, unlike nature, seeks to make each part of a mechanism in which positive motion is created follow a circumscribed path, generally in one plane, and where a complicated movement has to be obtained it is arrived at by the combination of a number of simple movements of different parts. Otherwise, where complicated and indefinite movements take place in mechanisms, these will generally be found to be movements of accommodation, as, for instance, at a universal joint between two parts that cannot be rigidly connected. Engineers hardly ever combine two functions in one moving part as nature does. . . . Whitman's operation substitutes a hinge of limited movement for what is almost a universal joint. With the springs that normally limit and control the action of the universal joint out of order, this would seem to be the best thing one can do, if it were not for the disadvantage of shortening. Further, in the Whitman operation there will be greater stability in a sideways direction owing to wider contact between leg-bones and foot, which will withstand better unequal lateral pulls."

The theoretical approach to the problem of tarsal reconstruction therefore agrees generally with the results of surgical practice.

The refashioning of the neck of the astragalus, combined with triple arthrodesis, which is associated with the name of Michael Hoke, has for the last three years been extensively practised in North America. On the orthopædic service at Harvard it is much employed, and their view of it is expressed in a letter I received some time back from Prof. Allison, of the Massachusets General Hospital, who says:—

"It is a better operation for calcaneus than for equinus. In paralytic calcaneus it gives a most useful foot. Backward displacement is the important essential, and long fixation in plaster is desirable. It has no place in spastic feet, but is very useful in club-feet where manipulation is insufficient."

Emphasis may be laid upon the only two points about which there is any general agreement among those with experience of foot reconstruction. They would all rather deal with calcaneus than with equinus, and they almost all insist on the need of backward displacement.

There is no doubt that Hoke's operation yields good-looking, serviceable feet without instruments. It is also successful in equinus, because it corrects the downward pitch of the neck of the astragalus and metatarsus. No doubt some deformity thus abolished had its origin in muscular paralysis and stretching of the astragalo-scaphoid ligament. My criticism of Hoke's operation is its unnecessary difficulty. As I saw it practised at the Massachusets Hospital, the neck and head of the astragalus were taken out, held in forceps, and cut with an electric saw. In Hoke's words, the operator's aim is first to set the posterior foot which, after removal of the head and neck, is subject to the operator's wishes; and, second, to sink down the moulded head. I suggest that the "setting" is just as well performed after the removal of bone from the head of the astragalus as from the base of the neck. And it is certainly easier to mould the neck in situ, as does Dunn, than to reset and replace. Admittedly an exception might be made in severe equinus, where a very oblique neck would fuse with the scaphoid at too sharp an angle. This angle is avoided when the surplus bone is removed from the base of the neck.

Straight Triple Arthrodesis.

The alternative method of arthrodesis in general use at the Hospital for Sick Children, Toronto, consists in simple excision of the joints between the astragalus, scaphoid, and calcaneus. Relapse is infrequent. Dr. Gallie, in whose service I was privileged to work for a year, has told me that he thinks the slowly progressive form of relapse, which is apt to occur in children under ten, is due to actual change in the shape of the bones, such as occurs after arthrodesing operations at the knee-joint in young children. Dr. Gallie's favourite operation is subastragaloid and mid-tarsal arthrodesis with a tendon fixation of the tendo Achilles into the back of the tibia. He says that this operation has the advantage of stabilising the foot, and so allowing the patient to wear a high boot in cases of shortening. It does not shorten the limb; it holds the foot firmly in any desired degree of equinus, and it enables the patient to take weight on the ball of the foot.

The arthrodesis of spastic feet is employed much more in Toronto than in Boston. In a recent letter Dr. Gallie says: "I am strongly of the opinion that mid-tarsal and subastragaloid arthrodesis is an excellent operation for spastic paralysis." He goes on to say that he has half a dozen beautiful results, far better than he has ever seen with any other form of treatment.

I have recently performed the Toronto operation on three patients; one had an equino-cavo-valgus, and the other two had almost flail-feet in equino-varus. The operation gave them good plantigrade feet, although the first case still had five degrees of valgus. They have from 30 to 60 degrees of movement at the ankle, and one still wears a calliper to the hip. They all walk from one to five miles, and one kicks a football with the operated foot. Two of them have 2 per cent. anterior displacement, the other has no displacement. Two showed, under the X ray, bony union throughout, and all showed painless firm ankylosis.

Whitman's Astragalectomy.

I have had the privilege of studying a number of astragalectomy patients whilst assisting Mr. Laming Evans at the Royal National Orthopædic Hospital. This method appealed particularly to the mathematician and consulting engineer, who viewed it from a mechanical standpoint. It is very valuable for painful osteo-arthritis of the ankle and sub-astragaloid joints after fracture or disease of the astragalus. It gives relief from pain on walking, increases mobility, and so improves the shape of the foot as to make recognition of the injured limb difficult. One of Mr. Laming Evans's cases illustrates

this: fibrous ankylosis had followed a pneumococcal abscess of the tarsus; after astragalectomy there was 40 degrees of movement at the new joint, no lateral deformity, good stability, and a shapely foot. The patient needed a three-quarter inch cork.

Personal impressions offer the only means of assessing the results of astragalectomy. Sometimes success is undoubted, as in a patient aged 19, from whom Mr. Laming Evans removed the astragalus in childhood. The man now works as a farm labourer, plays football, refuses surgical boots, and wears those obtainable in a village shop. As a rule, however, difficulty of assessment is due to associated paralysis and the length of time over which treatment has been spread.

To 19 consecutive cases at the Royal National Orthopædic Hospital I applied the following test: could the patient, in his present condition, get about well enough to act as a doctor, lawyer, housewife, teacher, or domestic servant? I concluded that 13 of the 19 could have done so, and six of them could do much more. Of the remaining six the disability of three was due to paralysed quadriceps. Another one had a paralytic dislocation of the foot. The astragalectomy was performed 13 times for calcaneo-cavo-valgus, and in 12 of these improvement followed. It was performed seven times for equino-varus, and in five of these improvement followed. These results are similar to those given by J. E. M. Thomsen in 1924, and Wallace in 1916. The paralytic group included 16 cases, of which 15 were improved. The congenital group included four cases, of which two were improved. The posterior displacement, estimated in percentages of foot length, varied from 1 to 12 per cent., with an average of 5 per cent. No definite correlation was established between posterior displacement and functional results; this may have been due to the presence of associated deformities, and the difficulty of measuring posterior displacement. The method was to measure the length of the foot which lay behind the external malleolus, and to speak of this as a percentage of the foot length. The difference in this percentage on the two sides is a numerical measure of the displacement.

Dr. Royal Whitman, in his text-book, criticises Dunn's operation for not giving enough displacement to prevent dorsal flexion. Posterior displacement is admittedly necessary in calcaneus to restore the grip of the fore-foot in walking, but it is equally important that the limb should function as a firm pillar with a stable base. I believe that many patients after Whitman's operation must be seriously handicapped when barefoot on a slippery surface, as in taking a bath, and that Dunn's reconstruction often gives a firm pillar together with good fore-foot grip.

I have had the privilege of studying this operation at the Hospital for Sick Children, Ormond-street, on the service of Mr. H. A. T. Fairbank, and the following remarks are based on 20 consecutive cases of his, with three of my own, treated elsewhere.

The average age of Mr. Fairbank's series was eight years, and the average time since the acute disease six years. In 11 patients there was some variety of equinus, and in the other nine some variety of calcaneus. I found no definite correlation between the quality of the result and the amount of posterior displacement. Feet with a posterior displacement of 4 per cent., 8 per cent., and 11 per cent., all gave excellent results. A comparison of these results with those after Whitman's operation shows an equal amount of posterior displacement, the average in both procedures being about 5 per cent. of the foot length. The actual shortening of the leg after Dunn's operation was trifling, perhaps a quarter of an inch, compared with a shortening of a half to one inch after Whitman's operation. There was a shortening of the foot of about 10 per cent. after Dunn's operation. There was no failure in the series, and in almost every case the result might be called good. Clinically, there was always painless firm ankylosis of the tarsus, although radiograms showed lack of bony union between the astragalus and the cuneiforms. Between these bones there was bony union in two cases only, and in the majority they were widely separated. There was usually bony union between the os calcis and the astragalus, and between the os calcis and the cuboid. After operation all the patients possessed useful plantigrade feet, although five of them had about 20 degrees of varus, two others 5 degrees of varus, and one 5 degrees of valgus. The average movement at the ankle-joint was 50 degrees.

The results are very similar in three Dunn's operations that I have recently performed. All were over 15 years of age. Two were for drop-foot and one for calcaneus. All three have good plantigrade feet with painless ankylosis. In the drop-foot there has been an increase of power in the dorsi-flexors. The calcaneus foot is efficient and shapely.

Summary.

Assessment of the results of foot reconstruction is difficult to express exactly, and must remain a matter of personal impression. My own preference is for the Dunn reconstruction, with an exception for astragalectomy when the astragalus is misshapen or subject to osteo-arthritic changes on both upper and lower surfaces.

The conclusions expressed in this paper have the defect that they are for the most part those of an observer rather than of a doer. It is usually a junior officer who is stationed in the observation post, and I am indebted to successive commanding officers for such excellent visibility that any failure to recognise facts presented is due to my own defective vision.

Clinical and Laboratory Notes.

A CASE OF VACCINATION WITH MENINGEAL SEQUELÆ.

By Dr. A. Lancet.

THE first cases of postvaccinal encephalitis were observed by F. S. van Bouwdijk, Bastiaanse, J. Bijl, and J. T. Terburgh during an epidemic in Holland in 1925. In the following year cases occurred in England, and at about the same time four isolated cases were reported to the Société Médicale des Hôpitaux de Paris by J. Comby, by J. Huber, and by P. Netter, and at Montpellier by Euzière and Pagès. I myself have reported a fatal case[1] of primary vaccination in an infant, and no doubt many have remained unreported. The following case was attended by a colleague in my own district.

An English professional man, aged 34, whose health was generally good, had been vaccinated in infancy and inoculated against typhoid and cholera in adult life. He was revaccinated in London on April 17th, 1929. His wife was vaccinated at the same time, but did not "take." On April 20th, while crossing the Channel, he suffered from headache which increased in severity during the succeeding days, and which became almost intolerable on April 24th. During the nights of April 23rd and 24th he vomited a good deal, and on the 26th I was called in.

His temperature was then 104·5° F., and the pulse-rate 60. The local vaccinal reaction was intense, and he was suffering severe pain in the limbs, the nape of the neck, and the jaws; he said he felt he would go mad with the pain. He suffered from phono- and photo-phobia, and Kernig's sign was pronounced.

A turpentine injection was made in the outer side of the right thigh, and one of pyoformine (Gobey) in the right buttock. The headache diminished on the following day and the pulse-rate increased, while the temperature remained around 102°. On May 1st, a fortnight after vaccination, the temperature fell to 98·6° and there was a tendency to cardiovascular collapse, with syncope and hypotension. This was rapidly relieved by digitalis and adrenalin. On May 6th the blood pressure rose and the headache disappeared completely. The urine became abundant and the patient began to sleep soundly. The abscess, which had

[1] Gaz. Méd. du Nord, Oct. 15th, 1928.

evolved slowly, was lanced on May 7th. On May 12th the temperature and blood pressure became normal and the patient felt well.

This case appears to be one of vigorous meningitic reaction, appearing early after an apparently successful vaccination. Whether or not it proceeds from the same cause as postvaccinal encephalitis is not known, but it is certainly less serious. E. Frommel and J. Baumgartner [2] have recorded a case of acute meningitis with slight leucocytosis which was cured in ten days. Postvaccinal encephalitis, on the other hand, begins from 10 to 12 days after a normal primary vaccination, usually in the later years of childhood, and half the patients die within ten days. H. M. Turnbull and J. McIntosh [3] have reported seven cases of encephalomyelitis, of which six were fatal. The lesions were quite different from those of encephalitis lethargica and of poliomyelitis, and in three cases inoculations of the brain and spinal cord revealed the presence of vaccinal virus transmissible to rabbits. Turnbull and McIntosh attribute the disease to Jenner's virus, but C. Levaditi ascribes it to a virus similar to that of epidemic encephalitis which happened to be in the patient's body and was only intensified by vaccination. Postvaccinal encephalitis is unknown in Spain, where rabbit neurovaccine is used.

The complication is so rare as to give little cause for alarm; nevertheless certain precautions should be taken. Primary vaccination should be done as early in life as possible. The scarification should be light and the insertions should be two in number and set some distance apart. Congenital debility, diabetes, herpes, and convalescence after influenza or measles should be temporary contra-indications. Finally, the patient should avoid fatigue and risk of infection, and should pay especial attention to nasopharyngeal hygiene.

Ardres, Pas de Calais, France.

FACIAL NEURALGIA DUE TO A HIDDEN ROOT.

By Percy G. Murden.

THE following case appears worthy of record:—

An elderly woman had suffered for many years from neuralgia of the left upper jaw. When interviewed she was very insistent on the degree of suffering she had experienced, and complained of "burning" pains in the area of the third to the eighth teeth on the left side, the sensation extending to the Gasserian ganglion. When asked to open her mouth for examination she protested strongly that she could not do so, but from her manner there seemed little doubt that tact would accomplish the "impossible." This proved correct, and examination showed that the left fourth, sixth, seventh, and eighth teeth were missing, having been extracted (according to the patient) some 20 years previously. The gingiva presented a perfectly healthy appearance, and a thorough search failed to reveal a sinus or localise the pain.

Radiogram showing root embedded in alveolus.

At this stage two facts were clear: the "impossibility" of opening the mouth had proved to be imagination; and no obvious local disease had been found to account for the pain. To have assumed, however, that the pain was also a product of the patient's imagination would have been shirking the issue; for the fear exhibited by the patient —or at least part of it—might be secondary to some other sensation. Consequently an X ray examination was made, which disclosed a root embedded in the alveolus below the floor of the antrum (see figure). The root was subsequently removed, and the patient has since reported that the pain has ceased.

It seems safe to assume that had not the psychological aspect received due consideration the case might have been classified as facial neuralgia with an obscure ætiology and left unrelieved.

London, W.C.

[2] Schweiz. Med. Woch., 1926, lvi., 857.

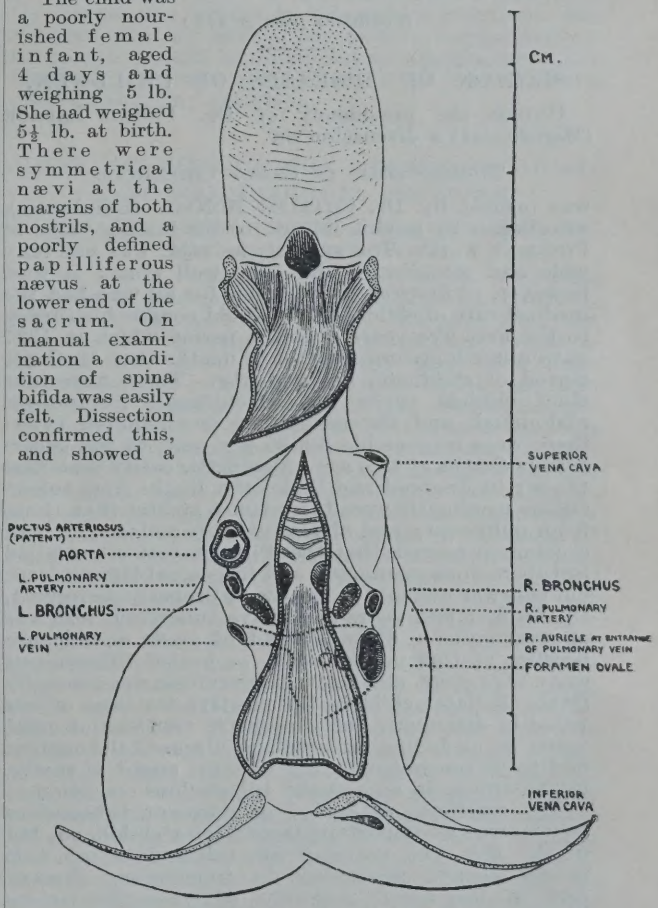
[3] Brit. Jour. Exper. Path., 1926, vii., 181; see THE LANCET, 1926, ii., 504.

A CASE OF CONGENITAL ATRESIC ABNORMALITY OF THE ŒSOPHAGUS.

By T. V. Cooper, M.R.C.S. Eng.,
JUNIOR ASSISTANT PATHOLOGIST, JOHN BURFORD CARLILL LABORATORIES, WESTMINSTER HOSPITAL.

THIS abnormality was found in the body of a child which had died of broncho-pneumonia.

The child was a poorly nourished female infant, aged 4 days and weighing 5 lb. She had weighed 5½ lb. at birth. There were symmetrical nævi at the margins of both nostrils, and a poorly defined papilliferous nævus at the lower end of the sacrum. On manual examination a condition of spina bifida was easily felt. Dissection confirmed this, and showed a narrow deficiency ¼ inch wide and 3 inches long. The nerves were normal in position. It had been noticed during life that the baby appeared unable to retain food, and when a small rubber catheter was passed into the œsophagus, milk immediately flowed into the postnasal space, causing an acute attack of dyspnœa, and the instrument was obviously not in the stomach. The child had never passed a normal stool, the motions consisting solely of meconium.



The child had been full-time with a normal presentation, but 14 days before labour acute hydramnios had come on, causing the mother to complain of œdema of the legs and shortness of breath. The fœtal parts could not be felt during this last period.

At autopsy the child's stomach contained gas and some greenish fluid, presumably bile. The œsophagus, when followed down from its upper end, terminated in a blind sac ¾ inch above the bifurcation of the trachea. There was no apparent continuation of this sac. When followed up from

the gastric (cardiac) end, the œsophagus was found to communicate with the trachea at its bifurcation. The lumen appeared of normal dimensions. Both the foramen ovale and the ductus arteriosus were patent, but I omitted to observe specially whether any other cardiovascular abnormality was present. No other congenital abnormalities were detected, but the right lung sank in water and showed several broncho-pneumonic patches, while the left lobe was markedly congested. The liver was toxic, but the spleen and kidneys were normal. The intra-abdominal umbilical cord was widely patent.

This type of abnormality has received considerable attention in the past.[1 2] Sir Arthur Keith and Dr. J. E. Spicer[3] offer the following embryological explanation.

"At the end of the third week the floor of the primitive œsophagus becomes depressed and shows dorsal œsophageal and ventral tracheal divisions. These are demarcated by lateral ridges which meet posteriorly in a crescentic fold. From the caudal end of the tracheal division grow the lung buds. By the end of the fifth week the crescentic fold spreads forward, uniting the two lateral ridges and thus forming the tracheo-œsophageal septum. To produce the abnormality presented in this instance, the lateral ridges and folds, instead of growing horizontally backwards to meet at the junction of the lung buds and œsophagus, thus dividing the primitive œsophagus in two, must grow obliquely backwards and downwards so as to meet on the dorsal wall of the foregut.

[1] Mackenzie, Morell: Manual of Diseases of Throat and Nose, Edinburgh, 1902, vol. ii., p. 216.
[2] Ballantyne, J. W.: Antenatal Pathology, 1904, vol. ii., p. 462.
[3] Keith, Arthur, and Spicer, J. E.: Jour. Anat. and Physiol., 1906–07, xli.

I owe my thanks to Mr. Stanley Dodd, under whose care the case was; to Dr. Braxton Hicks, senior pathologist, for permission to publish the case; and to the pathological clerk, Mr. Michael Perkins, for the preparation of the drawing.

BRITISH MEDICAL ASSOCIATION.

ANNUAL MEETING IN MANCHESTER.

(*Continued from p. 559.*)

SECTION OF DISEASES OF CHILDREN.

UNDER the presidency of Dr. PAGET LAPAGE (Manchester) a discussion on

TUBERCULOSIS IN EARLY CHILDHOOD

was opened by Dr. CHARLES MCNEIL (Edinburgh), who began by paying tribute to the lasting value of Pirquet's work. The subject, he said, was not only wide and complicated, but also well worn; it was, however, of first-rate importance for all who had the medical care of children. He would confine his survey to the first five years of life, a period which in 1927 gave a much greater number of deaths than the later period of childhood and puberty. There were four chief clinical types—viz., meningeal, respiratory, abdominal, and the general or disseminated type; these were responsible for 95 per cent. of the tuberculosis deaths at this age. Meningitis easily took first place; in England and Wales the deaths from tuberculous meningitis were three times greater than those from pulmonary and abdominal tuberculosis. It was a common remark that the Pirquet test often failed in tuberculous meningitis and in general tuberculosis, but this was not so if the test were properly performed. In the first two years a positive tuberculin test was of great value in diagnosis and of grave significance because at this period latent or healed tuberculosis was a rare event and active tuberculosis was generally fatal. In later childhood a positive test was of less value in diagnosis, but a negative test was of great value in excluding tuberculous disease, although it had to be remembered that the test might, if rarely, fail to appear in an actually tuberculous condition.

The existence of healed or dormant tuberculous lesions was an important fact in later childhood, but in the first two years of life tuberculous infection nearly always proceeded to tuberculous disease, and in the great majority of cases the lesions were in the abdominal mesenteric glands. The practical conclusion from clinical and post-mortem evidence was that latent tuberculosis could scarcely be said to occur in infancy and was uncommon in the later years of the period of survey. Tuberculous meningitis, so common and so deadly in the first years of life, was only the end-result of an earlier focus of disease implanted in the body; it was a secondary and not a primary type. In an analysis of 51 fatal cases the pulmonary glands were the seat of the primary lesion in 33, the abdominal glands in 16, and the cervical glands in only 2 cases. The value of post-mortem examination in tuberculous meningitis could hardly be exaggerated in revealing the situation of the primary focus, and in the majority of cases this was a thoracic lesion. Of pulmonary tuberculosis there were four types—tuberculous bronchitis becoming broncho-pneumonia; acute caseous pneumonia with or without acute cavity formation; chronic fibroid pneumonia with cavities; and a caseous tuberculous process at the hilum of the lung, spreading into it. The first two types occurred at an age when simple bronchitis and pneumonia were common conditions, and they gave the same physical signs. Some clinical features were helpful in distinguishing the tuberculous condition; the illness was insidious in its onset and quiet in its course, but presently there was definite weakness, pallor, and loss of flesh. The X ray picture in tuberculous broncho-pneumonia was, of course, unmistakable. As to the third type, even at an early age pulmonary tuberculosis might be a relatively slow process, lasting for many months. The fourth type was more difficult to diagnose than any other, as there were only the general signs of a severe progressive toxæmia. One of the most interesting things about abdominal tuberculosis was the variation in its frequency in different towns and districts of the British Isles. In early childhood primary abdominal tuberculosis was a milk infection. A high death-rate and case-incidence of abdominal tuberculosis in any area were, therefore, a reliable index of widespread infection of the milk-supply with tubercle bacilli.

It was, said Dr. McNeil, hardly necessary to emphasise the greater importance of preventive as against curative treatment of tuberculosis at any time of life, and this was certainly true of the first period, where in some of its clinical types the number of deaths equalled the number of cases. The old heresy that tuberculosis was a hereditary disease, fatally transmitted from parents to children, still lingered in the minds of many and blinded them to the real dangers. The problem of milk in relation to tuberculosis in young children was complicated. Until all our dairy cattle were free of tubercle there were two ways of dealing with the situation: pasteurisation or boiling. It was a settled custom to boil our eggs; there was far more reason to boil our milk. The key to the problem of prevention of pulmonary tuberculosis in childhood lay in the early detection of cases of phthisis in the middle period of life, in their isolation, in their instruction in hygiene, and above all in the reduction of their numbers. The segregation of young children from tuberculous parents and insanitary homes, as in the Grancher system in France, was not feasible as a general policy; in the few cases where it was practicable it was, of course, the most effective safeguard.

Discussion.

Dr. H. THURSFIELD (London) confined his remarks to the clinical diagnosis of intrathoracic tuberculosis at two periods in childhood—viz., up to the third or fourth years of life and during school age. Below two years of age the diagnosis was extremely difficult between a chronic slowly resolving broncho-pneumonia, a tuberculous broncho-pneumonia, and a localised empyema. It was in such cases that the Pirquet and Mantoux tests were untrustworthy. The

points on which to rely in diagnosis were a positive family history, the discovery of a palpable spleen, enlargement of the lymphatic glands of the thoracic wall, and lung puncture in all doubtful cases. In children of school age the diagnosis of a frank pulmonary lesion was as easy as in an adult, but pulmonary or intrathoracic tuberculosis was diagnosed a great deal too freely. The greatest importance should be attached to direct contact with a known tuberculous subject and but little importance to a history of chronic cough, unless associated with failure in general health. A physical sign of importance was persistent loss of movement at one or other apex. X rays were not an aid in early invasion of the lung. A subcutaneous tuberculin test was of great value in a suspected case when the temperature was running evenly. In such cases a general or focal reaction was decisive.

Dr. J. M. SMELLIE (Birmingham) gave statistics from the Birmingham Children's Hospital which showed that in 15 per cent. of the autopsies over a seven-year period death was due to tuberculosis. In 33 per cent. of these the mediastinal glands were the seat of the primary lesion, in another 31 per cent. both the mediastinal and mesenteric glands were involved. It was reasonable to deduce, therefore, that two-thirds of the fatal cases in Birmingham were due to infection with human tubercle bacilli. To find healed tuberculous lesions in children under five years of age dying from other diseases was so exceptional as to be wellnigh negligible. Whilst an appreciable reduction in the death-rate had been obtained by present methods, it was doubtful if they would produce any further reduction. If advances were to be made in its prevention they must be made along other paths. To protect infants and young children from all contact with tubercle bacilli, even if this were possible, would not appear to be the wisest course, as it would but store up added troubles for the periods of later childhood and puberty. For prophylactic purposes it was generally agreed that tuberculin was of no value. Whilst Calmette's "B.C.G." vaccine had been in use for some years, much more detailed information was necessary before his claims could be accepted. In the meantime, discontinuity of infection could be obtained by removing children for a time from all tuberculous environment and from tuberculous milk, and was extremely beneficial.

Dr. STANLEY MELVILLE (London) regarded pulmonary tuberculosis as primarily an affection of the lung parenchyma. It was true that the primary focus might be so small as to defy detection, but the enlargement of the lymph nodes was a secondary stage. The following types of pulmonary tuberculosis were recognised as giving definite radiological evidence: (1) primary acute broncho-pneumonia (infantile phthisis); (2) miliary tuberculosis; (3) the adult chronic indurative type; and (4) hilum tuberculosis —the word hilum being used in a topographical sense, and not conveying any suggestion as to the pathological process which was present. A small primary focus in the lung might produce a secondary mass of glands out of all proportion to the initial lesion. Lack of recognition of this fact had allowed clinicians and radiologists to be overwhelmed by the size of the shadow in the lung. To regard such shadows as evidence of involvement of the lung root in a tuberculous infiltration was fatal to the rational interpretation of the films.

Dr. HUGH ASHBY (Manchester) said the difficulty of diagnosis lay in the early case of tuberculosis. He had almost given up the cutaneous tests as of no value. Of much more value were the clinical signs and a radiological examination. There should be no hesitation in needling the chest in any doubtful case.

Dr. CATHERINE CHISHOLM (Manchester) gave the results of her investigations into the incidence of tuberculosis in about 3500 cases of children aged 1 to 2 years. In only 50 of these was a definite diagnosis of tuberculosis established, and in 20 per cent. of these there was a family history of active disease. She urged that pasteurisation or sterilisation of milk was imperative at present, but tuberculous-free herds were the ideal.

Dr. E. A. SAUNDERS (London) pointed out the extreme value of the collaboration of the clinician and radiologist in diagnosis. Children went through a process of establishing their immunity with a certain disturbance of health. There was a ray of hope in not removing them from all tuberculous contact, but in allowing them to get subminimal doses of infection in order to establish gradually an active immunity.

The PRESIDENT said that recent measures to reduce infection had borne fruit. Apparent healed adult tuberculous lesions might be infectious to children as tuberculosis was very infectious during childhood. Depending on the dosage and severity of the infection, a number of cases in children were curable by fibrosis and calcification.

Prof. C. W. VINING (Leeds) said that a purely localised tuberculous infection did not produce systemic signs of note, and that hilum tuberculosis had been grossly exaggerated as a cause of ill-health. The skin reactions had a negative value, as in suspected tuberculous cases a negative skin test showed that the disease was not due to tuberculous infection. He doubted whether any X ray picture except miliary tuberculosis could be diagnosed as tuberculous. The diagnosis of glands at the hilum of the lung was very difficult and very doubtful.

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JOINT MEETING OF THE DERMATOLOGICAL AND RADIOLOGICAL SECTIONS.

X RAY TREATMENT OF THE COMMONER MICROBIC DISEASES OF THE SKIN.

The Joint President, Dr. W. J. S. BYTHELL (Manchester), introduced Dr. J. B. HIGGINS (Salford), who gave the opening address. He said that the progress of X ray treatment in dermatology might be divided into three eras. In the very early days results seemed miraculous. Later some mishaps and a few disasters brought X ray treatment into discredit. Study of the effect of X rays upon the skin, improved apparatus, and means of estimating dosage, had eventually made X rays one of the most reliable therapeutic agents in dermatology. Dr. Higgins proposed to discuss briefly the methods employed in the Manchester and Salford Hospital for Diseases of the Skin in treating the commoner microbic diseases. He said that when X rays were absorbed by the skin certain changes took place in the cells. Hertwig had stated that the secondary rays produced molecular changes in the colloidal albumins. Packard had presupposed enzymes controlling cell activity, which were stimulated by small doses of X rays. Large doses caused inhibition or even destruction of the life of the cell. Holzknecht's theory was that the effects of X rays were due to early changes which preceded injury, and to the suspension of inhibitory influences. Whichever view was adopted it was accepted that small doses of X rays had a stimulating effect in certain skin diseases, notably acne vulgaris. The essential factor was that diseased cells had a greater sensitivity and an effective dose could be given to them without injuring the normal surrounding skin. If hyperæmia was present, however, the surrounding skin was not normal, and there was a narrower margin between stimulation of diseased cells and injury to the hyperæmic area.

By the term "commoner microbic diseases" Dr. Higgins meant acne vulgaris (and indurata), sycosis vulgaris, paronychia, and furunculosis (including carbuncles).

In *acne* X ray treatment was now the method of choice, although it was not indispensable. The apparatus employed by Dr. Higgins produced a collection of soft and medium rays, and the erythema dose was estimated by the Sabouraud pastille. A preliminary course of three or four half skin doses (unfiltered) at weekly intervals was followed by a similar course employing a filter (of 0·5 mm.) of

aluminium. In a series of 31 consecutive cases of acne of the face there were no actual failures, though the results in 4 cases were indefinite, and in 6 cases of generalised acne the results in 2 cases were indefinite and one failed to respond. Dr. Higgins cited other methods adopted by various workers. Comparison of the total dosages administered shows that their skin dosage was roughly equivalent to those used in his practice. But no attempt to standardise the dose should be made for the actual absorption varied. Blonde skin absorbed X rays more readily that did more pigmented skin. The shorter the interval between treatments the more cumulative would be the effects. It was supposed that the curative action of X rays in acne was due to the stimulating effects of fractional doses of X rays. There seemed no doubt that there was no direct bactericidal action. It required 120 skin doses to kill a culture of *B. coli* and *staphylococci* (Kloverkorn, 1925). Dr. Higgins had found that doses up to eight skin doses actually stimulate the growth of staphylococci.

The treatment of *sycosis* was peculiarly difficult. It was almost invariably accompanied by hyperæmia, which was the vital factor in deciding upon the X ray dosage. The skin was hypersensitive according to the degree of hyperæmia. The three available methods of treatment, namely, (1) epilation, (2) stimulation of the affected cells, or (3) a combination of the two, must be applied according to the merits of the individual case. General guiding principles were, first, not to treat the acutely inflamed skin seen in mixed infections before the hyperæmia had been reduced. Even then not more than one-third skin dose at weekly intervals could be used. Secondly, with moderate hyperæmia not more than half skin doses could be used. If there was no hyperæmia the dose might be carried to the point of epilation, with effective results. In a series of 36 cases of sycosis 10 received epilating doses and 9 were cured. No filters were used in the treatment of these cases. Probably a filter of 0·5 mm. of aluminium would allow rather larger doses to be used without ill-effects.

Super soft rays had been employed in the treatment of skin diseases by J. J. Eller (1927). Using specially constructed apparatus he found that the phenomena of erythema, pigmentation, and cumulative effects from successive doses corresponded with those of harder rays, but that erythema appeared almost instantaneously (in two or three hours, or less). The penetration was less, and therefore after erythema doses, or even ulceration, healing took place without permanent effects (after fifteen months). The results in acne treatment were not better than those obtained with harder rays, but good results were reported in sycosis, paronychia, and carbuncles.

Discussion.

Dr. DOUGLAS WEBSTER (London) expressed interest in the theory, with which he did not agree, that the effect of X rays depended upon the total dosage, five to six skin doses being required to cure acne. He had found ten weekly applications of one-sixth skin doses quite as efficient, and some workers used only one-fiftieth erythema doses. He pointed out that excellent results in lupus had been obtained with high-voltage irradiations and radium, so that the worker need not limit himself to softer X rays.

Dr. FREDERICK GARDINER (Edinburgh) said that the dermatologist, though he need not be a radiologist, should have adequate X ray training. He considered X ray treatment in acne only an adjunct to constitutional treatment. He believed in smaller doses—that is, three doses of one-third skin dose at ten-day intervals. Six months of treatment brought the risk of telangiectases. Regarding sycosis, he did not believe in epilation by X rays, which have a deleterious effect on the skin.

Dr. RICHARD CONNELL (Carlisle) also regarded X rays only as an adjunct in acne treatment. Microbes could not be destroyed by X rays, except indirectly.

Dr. HALDIN DAVIES (London) pointed out that mild cases were not seen by the radiologists who were, therefore, pessimistic. Cases varied enormously in degree and ease of treatment. He emphasised the necessity of constitutional treatment. He usually applied two half pastille doses at an interval of a fortnight in cases of acne. For sycosis he preferred several small doses, avoiding erythema.

Dr E. HUNT (Liverpool) also emphasised the need for constitutional treatment.

Dr. FERGUSON SMITH (Glasgow) considered X rays the method of choice in the treatment of acne vulgaris. Personally he did not believe in such large doses, and did not exceed two skin doses per annum, unfiltered. He used doses of one-fifth pastille weekly, with a maximum of 12 doses. His results were brilliant. In sycosis he considered an epilation dose necessary. In treating boils, especially local, he had found a single pastille dose (with temporary atrophy of the gland) better than any efforts to destroy the microbes.

Dr. WILLIAM DYSON (Manchester) believed in small repeated doses for acne. With regard to sycosis, he condemned the use of X rays in acute inflammatory conditions of skin, on account of the risk of atrophy, telangiectases, and epithelioma. He used fomentations first, and X ray treatment after the discharge had ceased.

Dr. G. H. LANCASHIRE (Manchester) pointed out the possibility that under-exposure might be responsible for disappointing results.

Reply.

Dr. HIGGINS pointed out that all we can observe after stimulating doses is the clinical effect. We cannot state dogmatically that one-fiftieth or one-third of a pastille dose is the best stimulating dose. With reference to Dr. Lancashire's observation he had often seen patients who had previously had a course of treatment without any effect having been obtained. He did not imply that X rays alone constituted the method of choice, but X rays added to other methods of treatment. There must be coöperation between the dermatologist and the radiologist. The actual dosage used by him for epilation was three half pastille doses at weekly intervals, unfiltered, followed after three to four weeks by another dose using 0·5 mm. aluminium filter. Sometimes after one dose a mild erythema followed in about three days; in this event treatment would be discontinued for three months and recommenced with the filter.

Dr. LANCASHIRE then took the chair. He traced the growth of X ray therapy in skin diseases from the time, some 28 years ago, when Schiff and Freund founded the method which had become an indispensable part of a dermatologist's equipment. He then read the following paper on the

X Ray Treatment of Wounds,

contributed by Prof. LEOPOLD FREUND. Prof. Freund wrote that the older radiologists had found not only that malignant and chronic infective ulcers healed more rapidly under the influence of X rays, but also sluggish and badly healing wounds. Sunlight and powerful artificial light had similar effects. Whether the effect of X rays upon wounds was one of stimulation of healing, or of destruction of a factor inimical to cicatrisation, was of less importance than the fact that small doses were of admitted benefit in badly healing wounds. Prof. Freund discussed one particular indication of X ray treatment, that of fresh and open wounds. Since 1898 he had noticed the curative value of X rays on keloids, and later he had observed histologically that in keloids the hyperplasia of connective tissue commenced in numerous young round and spindle cells around blood-vessels. It had occurred to him that to irradiate these young and particularly sensitive cells might prevent keloid. Since then, after excision of tumours in persons predisposed to keloid, he had irradiated the wounds without stitching or skin graft, using small X ray

doses. The results were uniformally good, and the method had been employed in other conditions such as patches of lupus vulgaris, epitheliomata, rodent ulcers, keloids, and pigmented nævi. The advantages of this method over X rays used alone were, first, that X rays had not to penetrate the thickness of the lesion before reaching its base; secondly, if any traces of the disease were left, they were reached more directly by subsequent irradiation than if the wound had been stitched; thirdly, if local recurrences appeared they broke through the thin delicate scar more easily than if the wound had been stitched or skin-grafted. Such wounds, often thick and œdematous, sometimes prevented the recurrences from breaking through and thus delayed the recognition of their presence. The cosmetic results were excellent, and the scars as good as those obtained with Finsen light. In lupus vulgaris and malignant growths the period of irradiation was considerably shortened and over-radiation is avoided. The method was unsuitable where there was movement of the unstitched skin edges, for instance near joints or folds of skin, unless movement was prevented by firm bandaging. Wounds up to the diameter of about 10 cm. had resulted in perfect scars. The duration of healing appeared to be unaltered, and in animal experiments an irradiated wound healed slightly earlier than a control wound not irradiated. The dose used was about 6 to 7 Holzknecht units (H) applied at 6 or 7 sittings at intervals of two or three days. Unfiltered rays of 6 to 7 Wehnelt units (W) hardness are used. A contra-indication to the method was the situation of wounds near folds or angles of the skin. Prof. Freund did not recommend application of X rays before excision, because skin which had been recently X rayed sometimes reacted to every form of trauma with an X ray dermatitis. He quoted Richard Sparmann's statement that in Malays, who were liable to keloid formation, prophylactic irradiation before operation, or irradiation of closed operation wounds, was often useless.

Discussion.

Prof. M. HAUDEK (Vienna) agreed that results were better without the use of filters. He recalled good results in the early days before filters were used. He thought one should not regard Dr. Freund's dosage of 6 to 7 H as a set rule.

Dr. FERGUSON SMITH (Glasgow) said he had no experience of Prof. Freund's method of treating lupus. His method was to scrape the area, apply liq. hydrarg. mit. and irradiate three to four days later, using one application of X rays, though divided doses might be better. Comparison with non-irradiated patches showed definite benefit.

Sir NORMAN WALKER (Edinburgh) referred briefly to his experiences with X ray therapy. He hoped that closer coöperation between dermatologists and radiologists would bring to bear the experiences of both.

Dr. L. A. ROWDEN (Leeds) said that he did not believe in coöperation between radiologist and dermatologist. The dermatologist should do his own radiology and then the radiologist could not be blamed for occasional bad results. He pointed out that keloid following amputation of the breast was entirely prevented by X radiation. He did not advocate filters in dermatological cases.

Dr. DYSON said that quality and penetration of rays were much more important than the methods of application. Before the correct dosage could be prescribed we must know more of the exact action of X rays on cell metabolism.

The PRESIDENT suggested that there might be a return, in a modified manner, to the treatment of lupus by X rays, incorporating Prof. Freund's method. He still used the erosion method extensively, followed by local caustics. It would probably be of advantage to treat the clear granulating wounds, after separation of the sloughs, by exposure to X rays on the lines advocated by Prof. Freund. He had already tried the plan in two recent cases with promising results.

SECTION OF OTO-RHINO-LARYNGOLOGY.

Dr. WELLS P. EAGLETON (Newark, New Jersey) opened a discussion on the

CEREBRO-SPINAL FLUID AS AN AID TO DIAGNOSIS AND TREATMENT OF INFLAMMATORY INTRACRANIAL LESIONS.

Referring briefly to the arrangement of the primitive central nervous system, he went on to remind his audience that in mammals, including man, the mesh of the arachnoid mater grows out from the arterial system of the brain. Knowledge of that system enabled them therefore to construct a surgical map of the arachnoid and of the basal cisternæ. Where nerves left the cranium they carried a prolongation of the arachnoid as a fine tubular investment. So fine were the spaces of that system that they would retain the smallest concrete particles, though permeable to fluids. Any inflammation travelling along the nerves caused a reaction in this fine tube and completely obliterated it, shutting off the infected area from the basal cisternæ. But when we left the base of the brain there was no longer a system of large arachnoid spaces but a very fine network. Over the vertex we were concerned mainly with venous transmission of infection. The intracranial veins might be divided into the extradural veins and the venous sinuses, both of which had a dense fibrous coat; on the other hand, the cerebral veins had no outer coat, the place of which was supplied by prolongations of the arachnoid. Any inflammation involving these veins immediately involved the arachnoid. This explained the extreme virulence of intracranial complications of throat infections, which are borne by blood to the cavernous sinus. The clinical picture was not that of meningitis, but began with delirium and proved rapidly fatal. The problem of vertex meningitis was therefore that of the veins, while basal meningitis was concerned with the cisternæ. The arachnoid was part of the general protective mechanism of the body, a low-grade connective tissue. On infection, a rapid proliferation of cells occurred.

The cerebro-spinal fluid was entirely derived from the blood from all the vessels in the arachnoid, not from the choroid plexus alone. The latter did secrete chloride into the fluid, the chloride content of which was higher than that of the blood. The glucose content, however, was identical with that of the blood. In addition, the cerebro-spinal fluid contained a lytic ferment capable of digesting dead brain tissue, a fact that could be demonstrated in vitro. This process accounted for the pyrexia and convulsions that might occur following brain injury, and the presence of a toxin in the circulation (derived thus from the cerebro-spinal fluid) could be demonstrated by injecting the serum of a patient into an animal, producing convulsions in the latter. The cells found in the cerebro-spinal fluid were derived entirely from the arachnoid.

Points in Interpretation.—In interpreting the results of lumbar puncture in an inflammatory case he relied on the following points. Increase of pressure indicated irritation of the arachnoid. Disappearance of glucose meant that it had been consumed by bacteria. Diminution of the chlorides was of the gravest significance, and meant that the barrier between fluid and blood was breaking down. Increase of globulin indicated degeneration of brain cells. A yellow fluid was found when the blood was becoming disorganised and should be considered a presage of impending death. The site of a possible lesion should also be considered. For example, an effusion of blood in the posterior fossa produced all the symptoms of meningitis, with pyrexia and head retraction; in the anterior fossa it produced no signs unless it was large. Loculation might occur in inflammatory lesions, especially of the frontal region, and should be regarded as Nature's attempt to wall off the disease.

Diagnostic Points.—Papillœdema indicated one of three things: venous obstruction, renal disease, or

interference with return flow of cerebro-spinal fluid. It was thus often a sign of cerebral abscess. The otologist had several diagnostic tests to assist him. Absence of a response on caloric stimulation of the labyrinth when the head was upright (a normal response being found in the supine position) was an early sign of increasing intracranial pressure. Absence of reaction in all positions was of grave significance in meningitis, unless due to disease of the labyrinth itself. An effusion of blood in the posterior fossa produced a permanent diminution of the reaction to rotation, a point of great medico-legal importance. If there were infection of the frontal area the fluid from a lumbar puncture might be quite normal. The infection was then localised in the subdural space. In the middle fossa no local accumulation of cerebro-spinal fluid occurred, the infection passing directly into the brain; except that in fracture cases a loculation similar to that seen in the frontal region might be found. In the posterior fossa the arachnoid was divided into two compartments by the brain stem; a local collection of fluid in the posterior compartment might lead to sudden death, especially if lumbar puncture were done. Other symptoms of localising importance were the euphoria and mental changes seen with frontal lesions. If the middle fossa were involved there was pain from affection of the fifth nerve, and characteristic indentations of the visual field. When the posterior fossa was infected one saw the basal cisterna complex—pain behind the eye, attacks of stiff neck of varying duration, external rectus paralysis, contraction of the visual fields, and a semi-comatose condition.

Treatment.—Referring briefly to treatment, Dr. Eagleton expressed his belief that the proper course was to remove the primary focus of infection, and to evacuate any localised collections of infected cerebro-spinal fluid. In addition, he ligated the common carotid artery of the same side; this was fairly safe if done under local anæsthesia and if the eye was continually under observation during the operation. He did not regard continuous irrigation of the spinal spaces as a practical measure; it did no good, and might do great harm. Nor was anything effected by injecting drugs into the theca. In order to be at all disinfectant they had to be at a strength which instantly killed nervous tissue. He had recently experimented with intracarotid injections of mercurochrome.

The Significance of Variations in the Cerebro-spinal Fluid.

Dr. J. G. GREENFIELD (London) said that the point of greatest importance was whether the infection of the meninges was local or general. The cerebro-spinal fluid might vary from normal to that indicative of generalised septic meningitis. Reduction of chlorides he considered to be due to a septicæmia, and not to indicate damage to the meninges. Glucose examination he thought of no great value in this class of case. Increase of protein with a normal cell-count indicated a chronic cerebral abscess and was due to œdema of the brain and not to meningeal changes. A high proportion of protein to cells was unusual with a localised meningitis only. A turbid but sterile fluid with normal chlorides and perhaps only intracellular cocci indicated a localised meningitis, and the prognosis was not necessarily bad.

Dr. H. COHEN (Liverpool) stressed the importance of the chemistry of the cerebro-spinal fluid. He did not attach great importance to a diminution in chlorides alone, which was usual with any profound toxæmia. But in generalised meningitis the chemical constituents of the fluid tended to approximate to those of the blood. When therefore uric acid and phosphates of the fluid rose, and the chloride content fell, the outlook was bad. The significance of cells and of bacteria was less; thus with a cerebral abscess there might be many polymorph cells but the chemistry was normal, since the meninges were undamaged, and the prognosis might be good. He did not agree that there was any encephalolytic ferment in the normal cerebro-spinal fluid. Dead brain would autolyse in saline. But disintegration of brain tissue did alter the fluid in one important way—viz., it gave a strongly positive Wassermann reaction. This did not indicate syphilis, and knowledge of this point was of the greatest importance from the clinical aspect.

The PRESIDENT spoke of the great value and importance of an early report on the cerebro-spinal fluid in these cases. The examination was made as a matter of routine with all his own cases of this nature as soon as they were admitted to his wards, and the report was thus available at his first visit. So important was it that a resident pathologist had been appointed to the Manchester Royal Infirmary.

Mr. W. MOLLISON (London) read a paper on the

Drug Treatment of Spasmodic Rhinorrhœa.

He had employed thyroid gland for cases associated with pregnancy, and in two such, as well as in others not so associated, had had striking successes. The drug on which he ordinarily relied was calcium, either as the lactate, colloidal, or as kalzana. With the calcium he gave small doses of parathyroid extract. The results he had obtained with all treatment had been very variable. Frequently there was no effect at all, in other cases the treatment was completely successful. Of 40 consecutive cases, 15 were cured, 11 improved, 5 in statu quo, and 9 untraced.

Mr. LINDLEY SEWELL (Manchester) spoke of the importance of a sudden access of cold in bringing on an attack. Thus to get out of bed on to a cold floor might produce one. He had used kalzana. He thought the best results were obtained from a strictly vegetarian diet (excluding even milk, cheese, and eggs), and from sea air. The latter seemed particularly effective if it blew over a wide expanse of sand or mud. Any obstruction in the middle meatus of the nose must be removed.

Dr. J. ADAM (York) referred to the importance of general treatment, and the value of a cold douche after a warm bath in promoting vasomotor tone. He relied little on drugs.

Mr. F. HOLT DIGGLE (Manchester) considered that three factors had to be considered: 1. Endocrine disturbance. Diagnosis was difficult, but a polyglandular treatment was often effectual. 2. Infective. The condition followed an acute infective condition such as appendicitis; such cases were very intractable. 3. Neurotic. Hypopiesia was often the characteristic feature, and cure of the latter relieved the rhinorrhœa.

Mr. T. RITCHIE RODGER (Hull) read a paper on the

Reproach of the Chronic Running Ear.

He pointed out that the principal difficulty arose from the indifference of the general public to the importance of treatment; this indifference was being to some degree diminished by the work of school clinics. Prevention was better than cure; an early paracentesis would in many cases avoid a chronic otorrhœa. If in spite of active treatment, including removal of adenoids, the acute ear continued to discharge, an early resort should be had to mastoid drainage. Aural discharge that continued despite treatment for a month indicated mastoid disease; operation should not be postponed beyond the sixth week. A determined effort was necessary to impress the importance of early, vigorous, and complete treatment.

Mr. H. NORMAN BARNETT (Bath) said that he did not think the treatment afforded by school clinics was very effective. If simple treatment did not rapidly cure otorrhœa, mastoid disease was present. Although in certain cases zinc ionisation gave good results, he urged the importance of early operative measures. It was futile to continue with palliative measures that were not rapidly successful. The Schwartze operation was in most cases all that was needed. It was very safe and gave very good results.

Mr. C. A. SCOTT RIDOUT (Southsea) assigned great importance to early and vigorous treatment. After paracentesis or perforation he did not like to wait beyond three weeks unless the ear was healing, but did a Schwartze operation. That operation was very successful, and offered no bar to recruitment to the public services. He had observed that operation for the otorrhœa following acute fevers was often too long postponed.

Dr. J. ADAM said that he had found that in chronic otorrhœa very frequent lavage was effective. Every two hours the patient's ear was thoroughly syringed by a trained nurse; he had found an enormous improvement in the chronic cases so treated, few proving intractable.

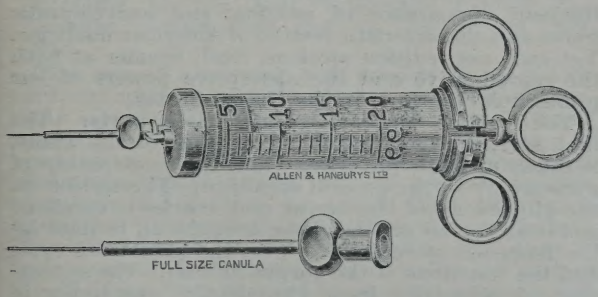
Mr. F. B. GILHESPY (Birmingham) said that he had been impressed by the importance of measles in the ætiology of chronic otorrhœa. In a large series of cases it was the starting-point in 1 in 4, and it had to be remembered that very many children suffered from this disease before school age. Local authorities were very difficult to move in this matter, but quite recently four beds had been assigned in Birmingham for the operative treatment of school-children.

Mr. R. SCOTT STEVENSON (London) had been impressed by the enthusiasm of school authorities, including medical officers, for ionisation. On the other hand, the general body of aural surgeons did not feel it. His own experience with this method was disappointing. Simple cleanliness was sufficient in most cases, and he believed that if the ear was meticulously cleaned it made no difference at all whether it was then ionised. He had tried both treatments in parallel series of cases, and had been forced to this conclusion: nearly all cases cleared up with cleaning alone; the remainder were resistant to ionisation and required operation.

New Inventions.

A VASOTOMY SYRINGE.

IN making an injection into the vas when doing a vasotomy two matters of primary importance in connexion with the cannula used are: (1) its point should be constructed so as to avoid damaging the inner lining membrane of the tube, and (2) the calibre should so fit the lumen of the vas as to prevent, if possible, any leakage out of the vasotomy opening of the fluid being injected. To overcome these difficulties I have had made a syringe, with fine bayonet-fitting and stainless steel cannulæ, which



cannot become detached whilst the injection is being given. The cannulæ—made in four calibres, 21, 22, 23, and 24 standard wire gauge—are each mounted in a shaft which forms a shoulder. This shoulder effectually prevents the cannulæ from being inserted too far into the vas, eliminates the possibility of puncturing it lower down, and occludes the remainder of the vasotomy opening.

Messrs. Allen and Hanburys, Ltd., of Wigmore-street, London, are the manufacturers of the syringe.

London, W. J. F. PEART, F.R.C.S.I.

Reviews and Notices of Books.

THE WORK OF MEDICAL WOMEN IN INDIA.

By MARGARET I. BALFOUR, C.B.E., M.B., C.M., late Chief Medical Officer, Women's Medical Service, India; and RUTH YOUNG, M.B.E., B.Sc., M.B., Ch.B., Personal Assistant to the Chief Medical Officer, Women's Medical Service, India, and Lecturer, Lady Hardinge Medical College, Delhi. With a Foreword by Dame MARY SCHARLIEB, D.B.E., J.P., M.D., M.S. London: Humphrey Milford, Oxford University Press. 1929. Pp. 201. 9*s*.

SOME ten years ago, in connexion with the annual report of the National Association for Supplying Female Aid to the Women of India (Countess of Dufferin's Fund), we took occasion to plead once again for the establishment of a Government service, holding that the task of providing Indian women with adequate medical attention was beyond the power of any unofficial body, however richly subsidised. We expressed the view that with the limited resources at their disposal it would be wiser for the Women's Medical Service to restrict their activities to a narrower field so as to ensure more assistance, better pay, and more adequate equipment for those medical women officers who had undertaken to live and work in India. This criticism brought a reply from Dr. Margaret Balfour, at that time joint secretary to Lady Dufferin's Fund, to which we gladly gave publicity. In this letter she explained the curious difficulties in administration and finance under which the Fund struggled to maintain its position and influence in the absence of complete official recognition. The arguments were impressive. The claim of the Women's Medical Service to a status equal to that of the I.M.S. has always been advocated in our columns, and in our Students' Number the conditions of the Service receive annual recognition. Dr. Balfour became Chief Medical Officer of the Service in 1920, retiring some years later only to return to India for research work on maternal mortality. She has now from her unrivalled experience both inside and outside the Service, and with the collaboration of Dr. Ruth Young, produced a book on the work of medical women in India which demands serious study. It is now nearly 60 years since the first medical woman landed in India. Most of the earlier pioneers have died; some of them survive but no longer do active work. It is right that the new generation of medical women should realise the efforts and achievements of their predecessors in order that their enthusiasm for future developments may be kindled and that their criticism of present conditions may not be too severe. Dr. Balfour and her collaborator survey the field of work and briefly explain the purdah system and those problems of caste and racial custom which make the need of medical women in India greater than in any other land. Admittedly the greatest handicap to the advancement of Indian women in any direction is their lack of education. The Indian woman, according to the authors, is not "groaning for release from the purdah or pining for the blessings of education. . . . The reason for pressing reform and education is not so much the happiness of individuals, but the improvement of the whole standard of Indian life by enabling women's influence to permeate society." A chapter is devoted to the praise of famous women and of others whose names have escaped recognition in Europe. The steps whereby the Countess of Dufferin's Fund has expanded into the Women's Medical Service for India are set out; the work of women medical missionaries is discussed and also the conditions of private practice. The history of medical education of women in India is briefly outlined. The figures for 1928 show that 253 women students were studying for a University course in India last year, 121 in the Lady Hardinge Medical College for Women only, and 132 distributed in the mixed medical schools of Madras (63), Bombay

(50), Calcutta (18), and Lucknow (1). In addition there were 5 taking a course for certified practitioners (apothecaries) and 445 studying to become sub-assistant surgeons. The last part of the book is taken up by a discussion of the present position of preventive medicine in India and of miscellaneous activities in which medical women have been concerned; three short appendices respectively on maternal mortality, infant mortality, and early motherhood show how difficult it is to collect accurate statistics in India.

The authors have given a balanced presentation of the work of medical women in India, past and present, and have set out their ideas of its future needs. It would be unfair to summarise still further the closely written argument in which the direction of future development favoured by these experienced workers are outlined. It should be studied alike by the enthusiasts and the sceptics among those concerned with the provision of medical aid to the women of India.

LABORATORY METHODS.

1. *Die Laboratoriums-Methoden der Wiener Kliniken.* Herausgegeben von H. K. BARRENSCHEIN und R. WILLHEIM. Leipzig: Franz Deuticke. 1928. Pp. 800. M.44.

2. *Clinical Laboratory Procedures.* By GEORGE L. ROHDENBURG, M.D., Director of the Laboratories, Lenox Hill Hospital, New York. New York: The Macmillan Company. Pp. 266. 14*s*.

3. *Laboratory Manual of the Massachusetts General Hospital.* Second edition. By ROY R. WHEELER, M.D., and F. T. HUNTER, M.D. Philadelphia: Lea and Febiger. 1929. Pp. 101. $1.75.

1. ATTEMPTS to include the whole field of modern laboratory technique in one volume will soon have to be abandoned since the essence of these books must be a detailed account of technique. There are very few methods of investigation, whether in biochemistry, bacteriology, serology, or hæmatology, which have escaped attention from Dr. Barrenschein and his colleague, although pressure on the space has cut down many descriptions to an absolute minimum. On the other hand, room has been found for mention of the snags which await the investigator, and the arrangement of the book is admirable. Certain inclusions and exclusions are surprising. The serological diagnosis of tumours is given great prominence, with many alternative methods. So is the laboratory diagnosis of pregnancy, including even a reference to extra-uterine pregnancy. And there is a chapter on cinematography and photomicrography. Among the omissions we note the serological diagnosis of hydatid disease, the skin reactions of asthma, and the complement-deviation test for gonorrhœa. Little help is given in the search for *Entamœba histolytica*, and the cyst illustrated is not characteristic. No references to fuller descriptions of methods are supplied. But most laboratory workers will find a use for this book, if their duties take them off their beaten track.

2. In his preface Dr. Rohdenburg states that this is a collection of laboratory methods which in his hands have shown their relative simplicity and clinical accuracy over a period of years. No claim is made for originality, free use having been made of all current text-books. The selection only of those methods of which the author has personal experience prevents the perpetuation of errors, but it is doubtful whether this is a valuable addition to the vast library of works on clinical pathology of trans-Atlantic origin. Unlike most of its fellows it has no illustrations; in so far as this saves space it is an advantage, but the advantage has been counterbalanced by the insertion of blank pages. In theory such blank pages are meant for notes; in practice they serve the young and zealous for the collection of an interesting series of samples of reagents, most of which are soon forgotten. Viewed in later years these bring back memories of happy student days as nothing else can, and occasionally supply a triumphant solution to a problem. Rarely, however, will any worker make a useful private collection that fills up more than a fraction of the space here provided.

3. The book by Dr. Wheeler and Dr. Hunter, unlike many of its kind, gives a good deal more than it promises. Only the first three chapters are devoted to laboratory technique, and though they are adequate they contain nothing beyond what can be found in most manuals of clinical pathology. The remaining three chapters, however, deal with special diagnostic procedures, therapeutic technique, and prophylactic measures, and are mainly concerned with work at the bedside. Here is assembled material hitherto available only in a scattered form in various books and papers. The technique of such procedures as the liver function test by phenoltetrabromphthalein, the Dick test, duodenal intubation, blood transfusion, cisternal puncture, and a host of others is clearly described. These three chapters are really valuable and should be of great service to the hospital resident and to the pathologist with clinical interests.

LES ACCIDENTS DE LA CHOLÉCYSTECTOMIE.

By SERGE HUARD, Ancien interne des Hôpitaux de Paris. Paris: Masson et Cie. 1929. Pp. 116. Fr.16.

THIS is a good review of the dangers of cholecystectomy. The anatomy of the bile-passages and hepatic artery is elaborated with all the variations which have been described. The author's contention is that irregularities are common enough to render hazardous the classical methods of removing the gall-bladder, and that the patient's safety depends rather upon the skill of the surgeon than the suitability of the technique. A new method for cholecystectomy is described of which the essential features are the separation of the gall-bladder from the liver first in the middle of its length; then those structures in the gastro-hepatic omentum which are liable to injury are pushed backwards and to the left without being exposed to view. There is nothing radically new in the procedure, which has only been performed in six cases. There is an interesting résumé of reported examples of injury to the ducts or artery.

GYNECOLOGY.

Fourth edition. By WILLIAM P. GRAVES, A.B., M.D., F.A.C.S., Professor of Gynecology at Harvard Medical School; Surgeon-in-Chief to the Free Hospital for Women, Brookline. London: W. B. Saunders Company. Pp. 1016. 48*s*.

IN this country we have learned to regard the frequent appearance of weighty and encyclopædic tomes as a characteristic feature of American medicine. Yet each new edition awakens fresh wonder at both the reproductive and the absorptive powers of our professional brethren in the United States.

The volume is divided into three parts. The first part, representing about one-fifth of the whole, is taken up with physiology and the relationship of gynæcology to the general organism. The section on the physiology of the uterus and ovaries is excellent so far as it goes and has been brought up to date by the inclusion of recent work on the menstrual cycle and the functions of the corpus luteum. The separation of obstetrics from gynæcology, customary in America, makes the attempt to discuss the physiology of these organs apart from their reproductive functions appear illogical. The relation of gynæcology to the breasts, skin, and to the digestive, circulatory, nervous, and other systems is also discussed only in so far as menstruation and disease in the reproductive tract are concerned, not from the wider aspect of its relation to the reproductive function as a whole.

Part 2 covers the diseases of the reproductive tract classified on a pathological basis. Inflammation is considered under the two headings of special inflam-

matory processes, almost wholly devoted to gonorrhœa and tuberculosis, and general inflammatory processes, in which an anatomical arrangement is adopted and the infections of the various portions of the reproductive apparatus are described together with those of the urinary tract and pelvic portions of the bowel. In our view no adequate perspective of the infections of the reproductive organs can be obtained, if due consideration is not given to those arising from the reproductive process itself. Here the venereal infections appear to have undue prominence, whilst post-partum and post-abortum infections do not receive attention commensurate with the part they play in the causation of pelvic infections. Such conditions as chronic metritis and chronic sub-involution are dismissed with less discussion than is warranted by their clinical importance. New growths are exhaustively treated and well-illustrated, and the other aspects of gynæcology receive their fair share of attention.

Part 3 on operative gynæcology takes up about a third of the pages. Here a full account of the details of surgical procedures is given and this forms the most distinctive feature of the book. It is profusely and clearly illustrated—so much so that many of the operations seem simpler and easier than they will be found to be in practice.

THE SCIENCE OF CHARACTER.

By LUDWIG KLAGES. Translated from the sixth German edition by W. R. JOHNSON, B.A. London: Geo. Allen and Unwin, Ltd. 1929. Pp. 308. 10*s.* 6*d.*

GERMANY seems to welcome an occasional revolt against the narrow confines of the professorial world; an extreme example is the movement for "Schools of Wisdom," associated with Prof. Count von Keyserling. Ludwig Klages is also known for his unconventional educational ventures, but has not gone so far from the beaten track. Apart from the somewhat sweeping cultural vision which takes all knowledge to be its province, the author's approach to the study of character is not unorthodox; but unlike most recent observers, Dr. Klages uses the static method. Modern psychological approaches to the genesis of character traits are concerned with finding the processes at work. Dr. Klages takes up the older standpoint and describes character, character traits, and peculiarities making for disorder. It must be admitted that he does this very well, with a culture and equipment that more fertile minds might envy.

SPEECH AND HEARING.

By HARVEY FLETCHER, Ph.D., Acoustical Research Director to the Bell Telephone Laboratories. London: Macmillan and Co. 1929. Pp. 331. 21*s.*

THE art of analysing and accurately measuring electrical currents, and the characteristics of mechanically vibrating systems, having reached an advanced stage of development, it became apparent some 15 years ago to the Bell Telephone System that great advantages would accrue from a similar analysis of speech and hearing, to enable their technicians to engineer their instruments with greater intelligence. This investigation has been proceeding ever since at their research laboratories; a considerable part of the effort has been devoted to securing devices which would convert sound waves into electrical form and back again with the least possible distortion, and out of these researches have come large and unexpected returns in the application of such devices to gramophones, to radio reception, and to apparatus for testing defects of hearing. Dr. Harvey Fletcher has embodied the results of these researches in a large and interesting work of which Part I. is concerned with the mechanism of speech and the characteristics of speech-waves, Part II. with the physical properties of music and noise, Part III. with hearing, its mechanism, limits of audition, and means of testing, and Part IV. with the perception of speech and music, the recognition of pitch, the effects of distortion, and kindred matters. That section of the book which deals with hearing is the most interesting to the medical man. On the theories of audition, Dr. Fletcher states his conviction that the evidence is overwhelmingly in favour of an extension of the theory originally proposed by Helmholtz, the modifications being introduced by our greater knowledge of the mechanics of the cochlea, and particularly of the effects of "loading" of the fibres of the basilar membrane by the surrounding fluid on the lines suggested by G. Wilkinson and A. A. Gray. The excellent description of various types of audiometer has a special interest, for there is little doubt that these instruments will be in general use by otologists in the near future. A very interesting form is one to be used for testing large groups to find those whose hearing is deficient for speech; the instrument is of a gramophone type in which the sounds gradually decrease in intensity; these sounds are conveyed by electric wires to receivers in the ears of those to be tested, who write down what they hear as in a dictation lesson. It was tried in a public school in New York City; 40 pupils could be tested at a time, and about 100 in an hour. There are also valuable tables for correlating the results of tests by tuning-fork, watch, speech, and audiometer.

The book is full of detail, and, though the many mathematical formulæ make somewhat stiff reading, could hardly be improved upon.

PSYCHOLOGY.

The Health of the Mind. By J. R. REES, M.D., Deputy Director of the Tavistock-square Clinic. London: Faber and Faber, Ltd. 1929. Pp. 261. 6*s.*

AMONGST the books on Modern Psychology for the use of the intelligent layman, this little volume ought to take a worthy place. The author starts from the neurological approach to bodily mechanisms—considering particularly the conditioned reflex and the endocrine glands. The influence of mind on body and of body on mind is dealt with in a separate chapter. This topic, however, cannot be discussed very deeply in a popular book, and the philosophic pitfalls are left uncovered. The rest of the book deals with psychological mechanisms, mental breakdown, and the problems of adolescence and childhood. The explanations brought forward are substantially based upon the discoveries of Freud, whom the author does not follow into the deepest recesses. However, the book illustrates both in vocabulary and in interpretation the indebtedness which all psychotherapists must admit to Freud and his school. The author gilds the pill, and makes what to many layman would have been a nightmare as recently as ten years ago a clear and adequate explanation of mental distress and failure.

The A B C of Psychology. By C. K. OGDEN, Magdalene College, Cambridge. London: Kegan Paul, Trench, Trübner and Co., Ltd. 1929. Pp. 270. 6*s.*

WE have learnt to expect learning combined with liveliness in anything from Mr. Ogden's pen. This book does not disappoint us, for his exposition has a freshness surprising in a text-book. In fact this volume is not a text-book in the strict sense of the word, but is an introduction to a subject which has already been departmentalised to an alarming degree. The book begins with a terse definition of the basic terminology, and in the text that follows additional terms are fully defined. Mr. Ogden's linguistic theories give a refreshing bias to his view of the body-mind problem, and his account of nervous mechanisms associated with mind is coloured by the work of Pieron and Watson. In his concise note on psychopathology he gives Freud the credit due to a discoverer and a pioneer without slavish acquiescence in the

detail of psycho-analytic theory. In the last 20 pages a number of psychological oddments, such as mental aspects of facial asymmetry, calculating boys, and musical prodigies are touched upon. In short, the author has his little fling before closing the book, and leaves the reader well entertained and disposed for more serious reading in psychology.

RADIUM IN CANCER.

The Conquest of Cancer by Radium and Other Methods. By DANIEL THOMAS QUIGLEY, M.D., F.A.C.S. Philadelphia: F. A. Davis Company. 1929. Pp. 439. $6.00.

THIS book contains the results of 15 years experience in the treatment of new growths by radium, together with a summary of the ætiology and pathology of the disease and an account of the uses of radium in non-cancerous conditions. The author has many good things to say and it is to be regretted that he has not succeeded in saying them more effectively. Particularly wholesome is his insistence on the necessity for diagnosing and treating cancer in its initial and curable stages, attention having been too much concentrated on the late stages of the disease. Dr. Quigley's manner of writing is confused and verbose, although he makes many dogmatic statements on subjects in which dogma is least justified. He complains that in his country the medical profession has not educated itself in the knowledge of cancer and that the treatment has consequently gravitated largely into the hands of quacks. He therefore advocates the concentration within the profession of all the scientific knowledge necessary to control the disease. But it may be doubted if the cause of science is advanced by the statement that the origin of tumour growth "cannot be other than the presence of low grade micro-organisms." The statement is entirely undocumented, as is every other statement in the book.

The time is not yet ripe for this kind of book, even if it had been better written. Precise information, which is here withheld, can alone decide the issue between radium and radical surgery, so that this book is useless to those who are seriously interested and misleading for the general or ill-informed reader. The volume contains 334 illustrations, some of which are good.

Reports and Analytical Records.

THE GERMICIDAL ACTION OF LISTERINE ANTISEPTIC.

(MANUFACTURERS: THE LAMBERT PHARMACAL CO., ST. LOUIS, MO., U.S.A. DISTRIBUTORS FOR GREAT BRITAIN AND IRELAND: S. MAW SON AND SONS, ALDERSGATE-STREET, LONDON, E.C.1.)

THE manufacturers of Listerine Antiseptic asked that their product might be examined for germicidal action by the methods described by their chief bacteriologist, Dr. George F. Reddish (formerly associate professor of bacteriology in the Medical College of Virginia, U.S.A.). Dr. Reddish has contributed many papers to the American journals on the subject of germicidal values and their determination and, as a result of the study of the action of phenol on newly isolated strains of various organisms, has suggested "standards" by which such organisms as *Staphylococcus aureus* and streptococci may be judged, in order that strains of equal resistance to antiseptics may be recognised and used in testing any unknown antiseptic preparation. For the purpose of the experiments here recorded, organisms conforming to the standards suggested by Dr. Reddish have been isolated and used. The culture medium has been prepared according to the formulæ given in the papers referred to, and the technique laid down by Dr. Reddish has been followed very closely.

The tests were conducted with *Staphylococcus aureus*, *Streptococcus hæmolyticus* and *viridans*, pneumococcus, and *Bacillus acidophilus* odontolycus types I. and II.

1. *Determination of the "Killing Time."*

The technique employed for the first test consisted of adding 0·5 c.cm. of a suitable broth culture of the organisms to be tested to 5 c.cm. of Listerine at 37° C. Subcultures were made with a large platinum loop into 5 c.cm. quantities of a broth suited to the growth of the organism. Owing to the short time required for the death of the organisms several separate experiments were necessary to find an exact end-point. In each case the very slightest growth, visible at the end of 48 hours, was confirmed by streaking some of the broth suspension on to agar. The *majority* of the organisms present were actually killed therefore in much less time than that recorded.

Staphylococcus aureus	20 seconds
Streptococcus hæmolyticus	20 ,,
Streptococcus viridans	15 ,,
Pneumococcus	10 ,,
Bac. acidophilus odontolycus type I.	20 ,,
Bac. acidophilus odontolycus type II.	20 ,,

2. *The Number of Organisms Killed.*

Using the same strains of organisms as were used in the first series of tests, plating experiments were carried out to determine the number of organisms killed in 15 seconds at 37° C. The method employed consisted in adding 0·5 c.cm. of broth culture of the organisms under test to 5 c.cm. of undiluted Listerine: 1 c.cm. of the mixture was then diluted with 99 c.cm. of sterile saline at the end of 15 seconds. Subsequent dilutions were carried out in order that 1 c.cm. of a final dilution might produce a suitable number of colonies when added to 15 c.cm. of melted agar (temperature 55° C.) and cultured at 37° C. in a Petri dish. The colonies developing in 48 hours were counted, using a Pake's disc for the purpose. Control cultures, made by substituting 5 c.cm. of sterile saline for the 5 c.cm. of antiseptic, showed the number of *viable* organisms present in the 0·5 c.cm. of culture used for the tests. In this way an exact estimate of the number of organisms *actually killed* was obtained. The average result obtained from three estimations in each case was recorded:—

	Millions of organisms killed in 15 seconds at 37° C.
Staphylococcus aureus	612
Streptococcus hæmolyticus	650
Streptococcus viridans	720
Pneumococcus	More than 800
Bac. acidophilus odontolycus type I. ..	640
Bac. acidophilus odontolycus type II. ..	606

3. *Experiments on Serous Membranes.*

By means of animal experiments, whereby the effects of injecting the antiseptic into the various body cavities was studied by killing the animals after the lapse of varying periods of time, the antiseptic was proved to be perfectly safe for use in all the body cavities.

4. *Conclusions.*

1. The statement of the manufacturers in regard to the killing times of various organisms is substantially correct.

2. The actual number of micro-organisms killed in 15 seconds by the undiluted antiseptic exceeds that claimed by the manufacturers; over 600 millions were found to be killed in the 15 seconds time limit compared with the 200 millions mentioned by the makers.

3. The antiseptic has been proved to be perfectly safe for use in all the body cavities.

THE LANCET.

LONDON: SATURDAY, SEPTEMBER 21, 1929.

DIETARY PRINCIPLES IN TUBERCULOSIS.

EVER since OTTO WALTHER issued his challenge at Nordrach to the digestive capacity of phthisical patients, dietetic methods have continued to take a leading place in the treatment of tuberculosis. It was in a way of speaking the first example of a serious attempt to deal with a deficiency disease. But this was all before the science of nutrition had properly arisen. The tragic lessons of underfeeding and starvation seen in Europe during and after the war have taught the vital importance of fats in bodily health, the subtle distinctions in quality of proteins and their constituent amino-acids, the influence of vitamins upon disease and the resistance to infection. The incidence of tuberculosis in particular has shown itself to be profoundly affected by such factors, and attention is turning from the mere sum-total of nourishment required to its nature and exact composition. Work at present being carried on in some continental clinics, notably in Munich and Berlin, has provoked a considerable interest in the German press, both medical and lay. This work has arisen from principles which may be shortly recapitulated, though it must be admitted that upon many points our knowledge is still far from complete. Inorganic salts in a diet, through their influence upon metabolism, and particularly upon water metabolism, are capable of affecting, either adversely or favourably, bodily processes in disease. The liability to infection is closely allied to the water-content of the tissues, as is seen in the poor resistance shown by œdematous tissues, and the latter is largely dependent upon the mineral constituents of the diet. Restriction of sodium chloride may lead to removal of water from the body, and it is possible that variations in mineral salts may in some degree affect the actual reaction of the blood and tissues themselves. Upon the view that the acid-base equilibrium may be shifted to the one side or the other, so may an "alkaline" or an "acid" diet be employed, though upon this subject we are as yet far from fully informed. It is, however, certain that sodium, whether in the form of chloride or carbonate, may act as a water-retainer, whilst such ions as calcium and magnesium are diuretic in action. A drying up of tissues has shown itself to be an essential mode of healing in many so-called exudative conditions, and the value of restriction in fluids and salt has been proved by many in the past and has found particular use in the hands of FINKELSTEIN, STRAUSS, and others in the treatment of eczema and wound infections, and of lupus.

An extension of this principle has now been proposed in the form of a partially salt-free diet for the treatment of other forms of tuberculosis. It originated with Dr. GERSON, of Bielefeld, Westphalia, and attracted the notice of Prof. F. SAUERBRUCH, who instructed his assistant, Dr. A. HERRMANNSDORFER to study Dr. GERSON'S methods and report.[1] A discussion followed before the Berlin Medical Society in July last to which our correspondent there has called attention.[2] Besides the limitation of sodium chloride in the diet, the sole feature to which H. STRAUSS[3] attributes its effect, the Bielefeld workers employ a substitute called mineralogen consisting of a mixture of potassium, calcium, magnesium, and other salts (the exact composition of the mixture does not appear[4]). The diet is, moreover, one in which fresh uncooked food with a high vitamin content is employed as far as possible with a corresponding restriction of carbohydrates. No attempt at over-feeding is made, but phosphorated cod-liver oil is given to the amount of nearly 2 ounces (45 g.) a day. A total energy value of roughly 3000 calories is advised, made up thus: protein, 90 g.; fat, 160 g.; and carbohydrate, 220 g. Protein is thought to lessen the sensitivity to infection, fats and lipoids to raise resistance, whilst carbohydrate excess is said to favour the spread of tuberculous lesions. The diet is thus one of very limited salt and relatively reduced carbohydrate content, in which raw food as far as possible is given, and in no sense one in which increased nourishment per se can be the ruling factor. There are obvious practical drawbacks to such a diet, as, for example, its high cost and its somewhat unappetising nature which may make it difficult to overcome the anorexia and idiosyncrasies of tuberculous patients. There is, however, no doubt in the minds of those who have employed it of the value of the diet in lupus. The figures given by HERRMANNSDORFER and others in Germany are impressive, and C. EMERSON has reported favourably from America. Results in bone and glandular tuberculosis seem to offer a definite advance on existing methods of treatment. In phthisis there is at present little unanimity. HERRMANNSDORFER reports definite benefit, and EMERSON in a series of ten cases obtained striking improvement. Others are sceptical and time will show whether hopes have been raised in vain.

Significant is the evidence that over-feeding may be actually harmful in pulmonary tuberculosis. The new testimony that limitation in carbohydrate intake may be beneficial is in accordance with the older experimental work of WEIGERT and with the newer work of E. ANDERSON, FINKELSTEIN, and others. A moderate protein allowance is supported by W. S. MCCANN, C. MARTIN, and others who have found the optimum amount for phthisical patients in bed to lie between 60 and 90 g. per diem. The value of a relatively high fat and lipoid content of the diet is nowhere denied, and a sufficiency of vitamins is clearly important. There is, however, no certain evidence that an excess of vitamins or fat can sensibly aid the body's resistance to tuberculosis. But the influence of mineral salts may well be of vital importance, and the work of STRAUSS, GERSON, SAUERBRUCH, and HERRMANNSDORFER may point the way to a realisation of this fact.

FOOT-AND-MOUTH DISEASE.

EPIZOÖTIC stomatitis has long baffled Ministries of Agriculture and has given rise to political difficulties, national and international. At the Ayr Congress of the National Veterinary Medical Association, to which allusion was made in our last issue (p. 574), a rather more optimistic feeling seemed to prevail regarding the situation in this country. There are several reasons why such a feeling may be

[1] Münch. Med. Woch., 1928, lxxv., 35; and Med. Klin., 1929, xxv., 1235.

[2] THE LANCET, August 24th, p. 404.

[3] Med. Klin., 1929, xxv., 1383.

[4] It can be obtained from Pharma, M. Loebinger and Co., Berlin, Wilmersdorfer-Strasse.

justifiable. Our knowledge of the disease has been considerably extended as a result of the last few years of research in this and other countries, much more is now known as to the longevity of the virus in particular circumstances, and this knowledge has pointed to certain probable sources of origin for the initial outbreaks. Further, there is less likelihood nowadays of the widespread escape of infection from an initial outbreak, as happened in 1923, owing to the strengthening of the Veterinary Service of the Ministry of Agriculture. We shall always be exposed to danger from slowness in reporting suspicious outbreaks on the part of the agriculturist, though it is probably true to say that to-day he is better educated in this respect and more alive to his responsibilities. Great Britain can, however, never afford to relax her watchfulness, and there is no better example than foot-and-mouth disease of the futility of a penny-wise pound-foolish policy. The extra expenditure involved in maintaining an efficient and numerically strong veterinary service, and the cost to the country of developing and extending research, are certainly repaid by results several times over. Research into animal diseases not only brings relief to the agriculturist, but it is of benefit to the public health, and for that reason commands the sympathetic attention of the medical profession.

Our knowledge of the virus of foot-and-mouth disease has recently undergone a radical change. It was regarded not long ago as a fragile virus outside the animal body, whereas now it is known to be very highly resistant under certain circumstances; for example, it can live for a period of two years when kept chemically dry; it can live for months on just those things which are most likely to result in its being brought into contact with healthy animals, such as hay, straw, bran, and clothing; and it can live for long periods in certain parts of carcasses of animals killed in the incubative or clinically infected stages of the disease provided these carcasses are kept at low temperatures. The virus can only increase in quantity in the body of the living animal, but there it is manufactured in enormous quantity and in amazing concentration in a matter of a few hours. Such is the concentration of virus in the vesicles that fluid from them is still infective in minute dosage when diluted ten million times, which means, as was pointed out at the Congress, that a tablespoonful of such fluid would make 30,000 gallons of infective fluid. In spite of the living body being such a prolific factory for virus production, nevertheless the infected animal's system very quickly purges itself of the virus, so that a few days after full clinical manifestation of disease animals cease to infect their fellows even on close contact. In view of these and kindred facts there would seem to be no reason to assume the existence of farm animals or vermin which act as true carriers of infection. Certain circumstances point to the origin of outbreaks in Britain from virus imported from infected countries in the ordinary course of trade. One such source was discovered a few years ago in undressed pigs' carcasses imported from Holland into Scotland. The possibility of infection reaching us in hay and straw used as packing materials and distributed to farms is beyond dispute, but the fact is very difficult to prove. There is strong reason to believe that some of our initial outbreaks originating in pigs have been due to scraps of chilled beef fed to these animals; indeed, the last two outbreaks in the United States of America have been definitely traced to such scraps of meat sold as pigs' food on shore from ships touching at American ports. We are dependent upon the chilled beef producing countries at present for about 50 per cent. of our meat-supplies, and, as their largest customers, we have every right to ask those countries to control foot-and-mouth disease at least within the premises of the frigorificos, in order to eliminate the very considerable chances of animals being killed for export when in the incubative stages of infection. It is understood that the countries referred to are endeavouring to meet our wishes in this respect, though their task may not be an easy one.

The question of human infection with foot-and-mouth disease was touched upon at the Ayr Congress. It has, of course, long been known that children, like calves, if they drink milk from foot-and-mouth infected cows are liable to develop a fatal enteritis. The losses in calves in this way are considerable in countries where the disease is enzoötic. Cases of supposed foot-and-mouth disease have been reported in adults, but only very rarely, and the diagnosis does not seem to have been supported by experimental proof. An interesting feature of the disease is the existence of three serological types of the virus. An animal can be made to pass through three consecutive attacks of the disease on exposure, in succession, to the three types of virus, and doubtless it is this phenomenon occurring naturally which has led to the belief that the immunity acquired by a natural attack is relatively short as compared with immunity in some of the bacterial diseases. The immunity left by the attack of any one type of virus against reinfection by its own type is now known to last for several months, if not for more than a year.

THE AGE OF MARRIAGE AND OF CONSENT.

AT the fourth session of the Advisory Committee of the League of Nations on Traffic in Women and Protection of Children held at Geneva in May, 1925, it was decided to institute an inquiry into the law relating to the age of consent and the age of marriage. The investigation has since been going on and replies have now been received from 42 countries. These are analysed in a report which was published at Geneva last year.[1] At first sight it would appear a simple task to compare the age of marriage and the age of consent in different States, but the inquiry was evidently not so easy as it might seem. The age of marriage is not absolute. There may be a minimum age not subject to exception; a minimum age under which, in exceptional cases, marriage may take place by dispensation; and an age, generally the age of majority, under which the consent of a third party is necessary. The age of consent is also subject to modification. It may be without exception, or with special provisos, governing for instance offences by juvenile delinquents who are of much the same age as or younger than the victim; again, specially severe penalties may be instituted for offences committed by persons in authority, such as foster-parents, guardians, or medical men. The committee was faced with the difficulty of classifying offences; eventually they decided to consider only cases of indecent offences against a boy or girl.

It does not require much imagination to see that the numerous divergences between the laws of various countries on these matters are not so unreasonable as they might at first appear. The desirability of a rigid minimum age of marriage appears obvious at first sight; but in practice where no exceptions are admitted the marriage age has generally been set very low. The advantage of some elasticity is shown in the fact that the common reason for

[1] Publications of the League of Nations. IV.: Social. 1928, iv., 20.

exceptions, in the States where they are admitted, is the pregnancy of the girl while it also becomes possible to raise the age minimum. The comparative figures in European countries and in the British dominions for the age of marriage are rather surprising. Great Britain, for instance, and Australia, have the low minimum age, not subject to exception, of 14 years for males and 12 for females; South Africa has 12 for females, part of Poland 7 for both males and females. On the other hand, subject to exception, Belgium has 18 and 15 years for males and females respectively, Denmark 21 and 18, Finland 21 and 17, France 18 and 15, and Germany 21 and 16. With regard to the age of consent, too, there are great discrepancies. In Great Britain and most of the Australian provinces it is fixed at 16, without exception, for both sexes, the figure for France being 13, Belgium 16, and Italy 12; while among countries which have an age limit subject to special provisos, in the United States of America this varies between 10 and 18 in the different States; in parts of Czechoslovakia, for both sexes, it is fixed at 14, and in South Africa, for women only, it is 16. The figures are not all strictly comparable, since they are formulated on entirely different bases. In the laws of Eastern countries there is also a marked divergence. In Japan, the marriage age, subject to exception, is 17 for males and 15 for females, and in China 16 for both sexes not subject to exception. The age of consent, not subject to exception, laid down for females only, is 13 in Japan and 12 in China. In Egypt the age neither of marriage (18 for males and 16 for females) nor of consent (14 for both sexes) is subject to exception.

In many countries, however, the minimum age of marriage bears little relation to the lowest age at which marriage actually takes place. In Great Britain, for instance, it must be many years since any marriage of a girl at the age of 12 has been recorded. But in some races, notably in India, a very low age of marriage is still the custom. The Indian press has recently given much publicity to proposals for alterations in legislation for the ages of both marriage and consent. The position in India is complicated, as regards the contraction of marriage, by the necessity of providing for so many different communities. The actual age at which marriage may lawfully be contracted is, except in Christians, undefined, but marriage cannot lawfully be consummated in females under the age of 13. Dr. MARGARET BALFOUR and Dr. RUTH YOUNG in a book reviewed on p. 613 note that the principle on which the Hindu custom of early marriage is founded is that young people of both sexes are likely to lead chaste lives and form lasting affections for each other if brought together early. But they state that the progress of education as well as legislation is tending to discredit early marriage. The age of consent in India (14, or 13 if the girl is married) applies only to females. The revival of interest in the subject in India at the present time may be due partly to Miss MAYO'S book "Mother India" and partly to the fact that the committee appointed by Government to consider the age of consent is expected to report shortly. The committee has, we understand, recommended the raising of the age of consent, and has expressed the opinion that a law penalising marriages between parties below certain ages is essential. The need for registration of marriages, which is not at present compulsory, is likely to be emphasised in the report. Meanwhile there are indications that any reasonable strengthening of the existing regulations would receive public support. At a recent meeting of the Social Hygiene Congress in London, Prof. CREW expressed the opinion that there is little or no difference between the age of puberty in the tropics and temperate climates. This view was not contradicted, although it is not in accordance with the general teaching of the past. If it proves to be well founded there can be no good climatic reason for maintaining such pronounced differences in the age of marriage as at present exist in different countries, and the trend of legisation is likely to be in the direction of uniformity at the higher age limits.

Annotations.

"Ne quid nimis."

NOISE.

SOME of our newspapers reproduce each day, from their hundred-year-old files, extracts whose triviality does not prevent their being sometimes more instructive than the records of important events. Thus we learn that the *Times* of Sept. 11th, 1829, reported complaints that officers had seized the horses of a stage-coach in the City and threatened to take them to the green-yard. The Lord Mayor, whose orders were in question, explained that it was his wish to prevent the disturbance of divine service, and that no one who went to church could deny that the noise of the stage-coaches frequently drowned the voice of the clergyman. Earlier references to the nuisance of street noises in London can be found, and residents of what is now the West End once complained bitterly of the bellowing and quacking that accompanied the market methods of the day. It is probable that traffic in our cities is now quiet in comparison with earlier periods, for the noisy impact of iron upon granite has been replaced by the almost silent contact of rubber and wood, though the spasmodic explosions, rattles, and hootings of to-day may be more disturbing than the continuous din of bygone times, and the householder living by a busy traffic route must reconcile himself to sudden onslaughts of rumbling and shaking, which may easily upset his temper and damage his dwelling.

Noise has lately become the subject of vigorous protest, and many ills are attributed to it. A direct effect is to be observed in boiler-makers' deafness, in concussion deafness, and in the temporary loss of hearing caused by exposure to the loud noise of machinery. The inability to converse with ease in a tube train affects alike all people with ordinary powers of hearing, and is accepted as inevitable. A similar inability in proximity to a pneumatic drill is apparently accepted as inevitable by the operator, but calls forth emphatic complaint from victims slightly more remote. Such obvious physical results of noise are not, however, its only offence. Health is said to be affected, and in his annual report for 1928 Dr. C. W. Hutt, medical officer of health for the Borough of Holborn, suggests that the use of the pneumatic drill should be prohibited on the ground of injury to the health of the workmen using it. Evidence of such injury would be a valuable contribution to the subject for, apart from the cases of deafness noted above, demonstrable effects of noise upon health are rare. Workers in noisy trades are not known to suffer from illnesses attributed to noise, and records of its influence upon output do not appear to be available. The Duchess of Bedford, in describing her recent flight to India and back, noted casually that all communications with the pilot had to be carried on in writing; yet the effect of noise upon the health of long-distance aviators is not a problem of importance, nor did anyone anticipate evil results to the contestants from the terrific roar of the machines in the recent Schneider Cup race. The ordinary noises of modern life are trivial when compared with this vibratory assault upon the human frame.

The real mischief of noise is not, then, any demonstrable physical effect upon health. It is unfortunately obvious that too many people—some drivers of commercial vehicles, for example—can endure it with equanimity, so long as they are producing it themselves; but to the busy brain-worker, to the sick, the nervous, or the wakeful, noise is a serious infliction to which adaptation may be impossible, though it is perhaps an unsafe proposition to advance that it can of itself induce nervous troubles. A distracted woman, who recently committed suicide after killing her daughter, left an emotional description of the noises that she declared had so tormented her

as to lead to the final tragedy. The description was evidence of a mind that would have grasped at any object upon which to project its inner troubles, but the uncritical publicity given to the case fostered the idea that noise can serve as a primary cause of insanity or suicide—an idea which, in view of the contagiousness of emotional states, would be wisely omitted from anti-noise propaganda. Such arguments are not needed. It is sufficient that many nervous people are peculiarly susceptible to all kinds of stimuli, and they have at least the right to be protected from those unnecessary noises that the ordinary man resents. This resentment may well serve as our standard, for our unsophisticated likes and dislikes are reasonable guides to conduct, and did not, for example, await the progress of science to tell us that butter was a better food than margarine, or fresh air and sunshine healthier than the smoke of the town. We need not wait for scientific proofs of ill-effects from modern din; our desire for peace and quiet is the justifiable foundation of the campaign against noise.

STREPTOCOCCUS IN RHEUMATIC FEVER.

IT is perhaps nothing more than a coincidence that the production of highly plausible evidence incriminating the streptococcus in scarlet fever has been followed by a recrudescence of the old theory that rheumatic fever is caused by an analogous organism. There is, however, a considerable difference between the two cases. In scarlet fever there is found a streptococcus which produces an exotoxin which kills rabbits and behaves like other exotoxins. In rheumatic fever a remarkably neutral organism is held responsible; and whatever toxin it produces is certainly of small virulence to animals. Three strains of this organism are discussed in the annual report[1] of the Metropolitan Asylums Board. These are Small's *Streptococcus cardioarthritidis*, Birkhaug's strain, and that of Lazarus-Barlow isolated in England. Dr. Lazarus-Barlow has described in an earlier communication how he extracts from these organisms an endotoxin which, when injected into rabbits, causes a slight rise of temperature and ill-defined lesions. He now relates an attempt to produce antisera to these three strains, and finds the rise in temperature diminished (but not prevented) when it is administered. But the antisera were strictly specific, each to its own strain. He concludes that the lesions produced in no way resemble those of rheumatic fever, and though he considers there is evidence of some endotoxin, this is no more virulent than that obtained from many strains held to be saprophytic. Of exotoxin there is no evidence at all. In a companion paper[2] Dr. N. Gray Hill is unfeignedly sceptical of any advantages following the administration of antisera prepared from these strains in acute rheumatism. Rheumatic fever, he remarks, is a disease running an uncertain and complex course, not to be compared with that of scarlet fever. Improvement following injections needs careful analysis and control, and in the 15 cases he describes he could find no evidence of improvement although serum rash was troublesome. An attempt was made to discover the frequency of occurrence of this type of organism in rheumatic and control cases. Fifty throat swabs in each series were forwarded, unidentified, to Dr. Lazarus-Barlow; 34 per cent. of the rheumatic and 42 per cent. of the control cases showed the organism. During the last three years Dr. J. C. Small, of Philadelphia, has recorded a remarkable series of cases showing the advantages of serum treatment with his specific antisera. The smaller series at Carshalton must be weighed in the balance on the other side of the scale. This series seems to show quite clearly that the incriminated organism is as widely spread among normal as among abnormal children, that it is of small animal virulence, and that evidence of antitoxin formation is scanty. Allowance must be made for variations in technique, but in the main Small's technique was followed by Dr. R. G. White at the Belmont laboratories of the M.A.B.

[1] Further Investigations into the Ætiology of Acute Rheumatic Fever. By P. Lazarus-Barlow, M.D., assistant bacteriologist, Queen Mary's Hospital for Children. Annual report for 1928–29, p. 379.

[2] The Relationship of *Streptococcus Cardioarthritidis* to Acute Rheumatism. By N. Gray Hill, *M.C.*, M.B., B.S., D.P.H., assistant medical officer at the same hospital, ibid., p. 385.

THE PREVALENCE OF GALL-STONES.

A STATISTICAL review of cholelithiasis, based on a scrutiny of the records of 9531 consecutive autopsies on patients of all ages performed in the General Infirmary at Leeds, is given by Dr. D. M. B. Gross, of the Department of Pathology of the University of Leeds. The basis of this review is the sounder for the fact that an autopsy is made on nearly every patient who dies in the infirmary. Taking the figures, then, as representing some 10,000 unselected individuals it appears that 6 per cent. of all men and 12 per cent. of all women have gall-stones. The age-incidence shown in the charts which Dr. Gross has drawn does not differ materially from what is commonly assumed, except for the demonstration that the solitary cholesterol stone is quite rare until the sixth and seventh decades. An entirely new fact, however, emerges from the statistics in regard to latency. In the 800 autopsies in which cholelithiasis was present the corresponding clinical notes and history gave no suggestion of their presence in 576 cases; in other words, cholelithiasis was latent and symptomless, so far as could be judged from the records, in about three cases out of four. The widely accepted notion that pregnancy contributes to cholelithiasis is negatived by this study; it offers no support to the view that gall-stones are more frequent in married than in single women. The conclusion Dr. Gross draws is that "the factors influencing gall-stone formation are common to both sexes, but more potent in the case of women. In addition to the common factors there is a sexual one, other than pregnancy, acting in women alone." The survey provides confirmation of the current opinion that faceted stones and pigment concretions are associated with cholecystitis, whereas the solitary cholesterol and mulberry stones are not. The association between the "strawberry" gall-bladder and the "mulberry" calculus is established on statistical grounds, apparently for the first time. There appears to be a definite relationship between diabetes and cholelithiasis, and also between atheroma and cholelithiasis. But no association between cholelithiasis—as distinct from cholecystitis—and peptic ulceration can be seen in the data here given.

THE DISCOVERY OF TWO DIFFERENT FORMS OF HYDROGEN.

WITHIN the past two years a discovery of more than ordinary importance was made in Germany, and excited great interest in scientific circles. The discovery consists in the theoretical prediction, followed by the experimental proof, that in ordinary hydrogen gas the molecules are of two kinds instead of being all alike. The new work led to much discussion at the recent meeting of the American Chemical Society at Minneapolis, and thus arose an impression in uninstructed circles that it had its origin in the United States. The discovery does not in any way upset present-day views upon the intimate atomic structure of matter, according to which the ultimate atoms of any element are composed of a positively charged nucleus inside a surrounding shell of negative electrons which annul the central charge. The atom of hydrogen consists of the simplest possible nucleus carrying a simple unit of positive charge, together with one neutralising electron outside. In the atoms of elements other than hydrogen the nucleus itself has a definite structure, being built up of a number of hydrogen nuclei together with a lesser number of electrons intimately welded together by forces whose nature is not yet understood. The

electrons and the hydrogen nuclei are the fundamental material out of which other elements have been formed, probably under the extreme conditions of high temperature and pressure existing in the stars. The new work leaves this conception unchanged, because it differentiates not the atoms but the molecules of hydrogen into two kinds. Ordinary hydrogen gas consists of molecules, each molecule being a pair of hydrogen atoms held together by a chemical band in a dumbbell-like structure. According to the system of mechanical principles which has been found in recent years to apply to matter considered on the subatomic scale, there should be two possibilities for the hydrogen molecule; the difference is subtle, but can be indicated by a crude representation of each nucleus as having a spinning motion which obeys the new mechanical principles and not the principles of ordinary mechanics; and the small difference between the two different kinds of hydrogen molecule depends upon whether the two nuclei of a molecule happen to have their spinning motion in the same direction or in opposite directions. This idea of a spinning motion of the nucleus is an addition to the earlier and simpler view in which the hydrogen nucleus was considered merely as a positive electrical charge. The two forms of hydrogen molecule, which have been named by their discoverer, K. F. Bonhoeffer, orthohydrogen and parahydrogen, can be separated at very low temperatures, and have slightly different freezing points and boiling points. Mathematical physicists have for some time been engaged in elaborating new mechanical and electrical principles to account for the ultimate structure and phenomena exhibited by matter. The real importance of the discovery lies in the fact that it confirms the truth of the principles tentatively adopted and gives confidence that the work is being pursued on the right lines.

ALUMINIUM SILICATE IN THE TREATMENT OF GASTRIC ULCER.

THE medical treatment of gastric ulcer in England at the present time is largely confined to dietetic methods combined with the use of various antacid remedies, such as atropine and alkaline salts. It is, however, of interest that bismuth carbonate is still used in large quantities either alone or in conjunction with the magnesias, although it is generally accepted that its virtue as an alkali is almost negligible. In assessing the popularity of bismuth it should be remembered that when originally employed it was chosen not as a neutraliser of acid, but in order to afford protection to the ulcer itself. In small doses this could hardly be achieved, but many physicians were accustomed to give it in considerable quantity in the belief that by settling in the ulcer crater it would assist healing. There is no doubt that when administered in sufficient quantity it is possible for barium and bismuth to remain for long periods in the craters of gastric ulcers; the phenomenon is one which has been observed by countless radiographers, but whether such a local plaster, as it might be called, is of any real therapeutic value is more doubtful. In recent times there has been a tendency in certain European countries, notably in Spain, to make use of aluminium silicate in the treatment of chronic gastric ulcer, and a certain number of successful cases, with X ray evidence of the healing of the ulcer under treatment, have been published [1] by Dr. F. Gallart Monés, of Barcelona. Treatment of these cases consisted chiefly of milk feeds given every three hours with 75 grains of a preparation containing aluminium silicate thrice daily; the results were satisfactory, the ulcer craters disappeared in X ray pictures, and the patients gained steadily in weight. It is a little difficult to decide to what extent the aluminium silicate was responsible for the results in these cases because, according to the author's own statement, alkalis were given in addition when pain was present; but there would appear to be grounds for believing that the substance selected is more suitable for producing a local protective effect than was its predecessor bismuth. The medical treatment of gastric ulcer still presents such difficulties, and the surgical treatment is so far yet from perfection that this new therapeutic suggestion appears worthy of further inquiry.

[1] Arch. Espan. de Enferm. del Aparato Digest., 1929, p. 1.

A POLYVALENT BACTERIOPHAGE.

THE differential diagnosis between cholera and dysentery is not always easy in the early stages, and the increasing use of the bacteriophage in the treatment of both infections has suggested the desirability of the preparation of a polyvalent form of this agent for use in tropical countries. From India, where d'Herelle and Maloine claim to have treated cholera successfully with the bacteriophage, J. Morrison and A. C. Vardon[1] report the production of a bacteriophage having a wide valency amongst different types of dysentery bacilli and strains of cholera vibrios. By combining various strains of bacteriophage, each of which had its activity raised to a maximun, they have built up a polyvalent mixture which they have tested upon a number of cholera and dysentery organisms in order to evaluate its full potentialities. The question whether the bacteriophage thus obtained is to be considered a true mixture of independent strains or a strain which has acquired polyvalent characters is not discussed in their paper. For therapeutic use the different lysing solutions were prepared separately, the bacteriophage being of such strength that the contents of the culture flasks were completely cleared after six hours' incubation. After mixing, the solutions were filtered through Chamberland F candles, and, if sterile, were issued for use. The authors state that a compound bacteriophage prepared in this way was used in two small outbreaks of cholera, comprising 60 cases in all, and that the mortality in treated cases was 29 per cent., against a mortality of 76 per cent. in the untreated cases. With regard to dysentery, they state that the combined bacteriophage is as reliable as the ordinary dysentery bacteriophage, but do not give any details of the results achieved. This paper is a typical example of a number of individual reports, covering relatively small collections of cases, which are appearing at the present time. The value of such reports in creating interest in the possibilities of a new remedy is undoubted, but, as we noted, referring to the observations of Dr. A. Compton in our issue of August 10th, p. 289, it is important to devise clinical experiments with the object of estimating the true place of this agent in therapeutics. The bacteriophage acts only against living and multiplying bacteria. Theoretically it should find conditions very suitable for its activities, especially in cholera, and to a somewhat lesser extent in dysentery. If the bacteriophage will act as a destructive agent of these organisms in vivo, the discovery is of immense importance. Cholera and dysentery take a large toll of human life, and if their specific cure is really in our hands, the fact should be capable of proof in a fashion which will refute all statistical criticism, and comply with the requirements of a properly controlled scientific experiment. It should not be impossible to reduce the variable factors in two extensive and parallel series of cases to a single one—the administration or non-administration of the bacteriophage—and to settle whether under identical conditions this single factor sways the prognosis, and to what extent. Such an investigation is all the more urgently called for, since in the careful laboratory experiments of W. W. C. Topley and his collaborators no protective effect could be shown from the oral administration of the bacteriophage. There is, in the long history of medicine, such a melancholy tale of sovereign remedies, which one after another have fallen into discredit and are forgotten, that we are justified, even in the much abused name of humanity,

[1] Indian Journal of Medical Research, 1929, xvii., 48.

in asking that the test shall be fairly made before we finally accept any new specific. This Ehrlich did for salvarsan; this Roux, Martin and Chaillaw did for diphtheria antitoxin; and these have stood firm in the "quaking bog of therapeutics." How will it stand with the bacteriophage?

A FREE GIFT OF SPLINTS TO HOSPITALS.

GOVERNMENT contractors have still on their hands a large stock of splints and kindred items which they took over from the Royal Army Medical Corps at the end of the war. They have decided to give these away free of charge to hospitals, infirmaries, cripples' homes and similar institutions rather than hold them over a period of years to meet the slow requirements of the ordinary market. The whole of this stock is new, and although slightly store-soiled is in useful serviceable condition. The following are the principal items:—

Arm splints, wood, Clarke's pattern	85
Wrist splints, dorsiflexed, iron	50
Leg and thigh splints, wood, Liston's pattern, with or without footpiece, in sets of three .. Sets of each	150
Extension apparatus, Guy's pattern, complete with clamp, shot can, pulley, and cord	450
Humerus splints, iron, Le Page pattern	30
Back leg and thigh splints, wood, hinged at knee, with adjustable footpiece	140
Leg splints, iron, Jones's skeleton pattern	45
Arm extension splints, Sinclair's modification of Thomas's knee splint, with swivel ring	2600
Bed cradles, iron, Lawrence's pattern	90

We have no doubt that many hospitals will make haste to avail themselves of this generous offer. All the splints offered are those in routine use, and the opportunity should prove particularly valuable to the smaller hospitals on which the increasing number of motor accidents makes such heavy demands. The Sinclair arm extension splint with swivel ring proved its value in the war, and while it is undoubtedly the best all-round splint for arm cases in bed it is frequently absent from hospital equipments. The Liston splints, while now little used in the ward treatment of fractures, still retain their value as first-aid appliances, and should prove useful to hospitals which have ambulances to bring in accident cases. An illustrated list will be sent post-free on demand by Messrs. A. Fleming and Co. (Surgical Supplies), 39, Victoria-street, London, S.W. 1, and the splints will be packed free of charge and despatched carriage forward. The public-spirited offer merits the gratitude of the hospitals which will benefit by it, and is one, we feel, which might be followed with advantage by other firms.

IRRADIATION AND HEALTH.

THE suggestion made early this year by the Medical Research Council that artificial light may not be an effective agent in all circumstances was founded on the results of controlled observations on school-children and on the irradiation of varicose ulcers. The protocols of two of the investigations which led to the doubts expressed in their annual report for 1928 have now been published,[1] and the public will see how carefully these investigations were planned. The result of one of the experimental studies has already appeared,[2] but without the long table setting out details of each case. The other investigation now recorded in full is that in which a group of 287 school-children were divided into three approximately equal batches, one batch being exposed to light from a naked carbon-arc lamp in doses deemed appropriate, another batch to a similar lamp screened by window glass, while a third batch received no irradiation at all. The weight of each child in the various batches was noted periodically throughout the six months during which the experiment was carried out, and the height at the beginning and end of the period. A daily record of colds and coughs was kept, and of the prevalence of infectious fevers. The occurrence of chilblains (low in all the groups), the progress in school work, the incidence of diseases other than colds, together with the subjective impressions of teachers, parents, and the medical officer were also noted. Unfavourable symptoms attributed to treatment were rare and trivial. All these results, when carefully collated, gave no clear indication that either type of irradiation had produced either harmful or beneficial effects. In a prefatory note to this report the Medical Research Council make it clear that these investigations are only a part of a many-sided programme of study, and that the results of the particular inquiries here recorded supply answers only to the precise questions which Dr. Colebrook chose or was able to put. It would be legitimate for anybody to criticise her report on the grounds that she used the wrong kinds of rays, applied them too long or too briefly, at intervals too long or too short, but only provided that he can produce valid evidence that some kind of radiation applied under conditions obtainable in the wholesale treatment of school-children has a beneficial effect demonstrable under conditions as critically controlled as those of Dr. Colebrook's experiment. Until this has been done it is proper to doubt whether light treatment under such conditions will have any real benefit, and, further, whether the greater incidence of minor ailments among school-children in an urban area during the winter months is due in any significant degree to deficiency of light.

[1] Irradiation and Health. Two Experimental Studies by Dora Colebrook, M.D., B.S.Lond. 1929. Special Report Series. H.M. Stationery Office. Pp. 47. 1s. 6d.

[2] THE LANCET, 1928, i., 904.

ACCLIMATISATION.

THE people of Jacobabad live in July under an average temperature of 98° F., or two degrees below blood heat, whilst in certain inhabited parts of Siberia the midwinter temperature is 60° F. below zero. Though much can be done to protect the body from such extremes, notably by creating artificial climates inside clothes or walls, a good deal of physical adaptation is required by those who greatly change their environment. This acclimatisation, always a fascinating study, has lately found a commentator in Sir Aldo Castellani, who has compiled a mass of valuable information into a short paper,[1] well illustrating both his practical knowledge and his original outlook. One of his maps shows that human energy is highest in Western Europe and the United States, and lowest in South America and South Africa. In the tropics much, of course, depends on humidity, and it has been found that the temperature of a normal man suitably clothed can be regulated so as to remain within normal limits with a high air temperature provided the humidity is low. Haldane found that there was no abnormal rise of temperature till the wet bulb indicated 88° F., provided the experimenters were stripped to the waist or clad in light flannel. If, however, the wet bulb exceeded this temperature by even a degree, then the body temperature rose hour by hour in proportion to the rise of the wet bulb above 88° F. With this abnormal rise of temperature there was an increase of the pulse-rate of about twenty beats per minute for every degree Fahrenheit. When Europeans first enter the tropics there is an increase of pulmonary capacity, but this is only temporary, and possibly due to the diminished quantity of blood which has been diverted to the congested skin and liver. No change is noted in the pulse-rate of the majority of normal Europeans on entering the tropics; the blood pressure is usually lowered. A tropical climate per se, says Sir Aldo, does not cause true anæmia; indeed in a series of observations made by Kop there was no difference in the blood of people in temperate and tropical

[1] Reprinted from the Jour. Trop. Med. and Hyg., July 1st and 15th, 1929.

climates. After discussing climatic effects on the digestive and urinary systems, and on endocrine metabolism, he passes on to the effects of pressure, and some of the local winds of the tropics. A further interesting section, on the rays of the sun, contains résumés of experimental work in connexion with the absorption and properties of these rays from the point of view of tropical medicine, and after some consideration of chronic skin irritation and of pigmentation the paper concludes with practical hints on clothing.

The section on the effects of heat contains useful information on the various ways of taking temperatures. Sir Aldo says that if a temperature reading in the axilla is to correspond with a reading in the mouth the axilla must be dry; in the tropics there may be several degrees difference between axilla and mouth. Pembrey and Nicol point out that the temperature in the mouth is apt to vary considerably, and that it is not reliable in cold weather or after exercise, and Haldane has found that it varies greatly in different people. In warm and moist air the mouth temperature approaches the rectal. The reason why the oral temperature is lower than the rectal is said to be that in cold air the proximity of the skin, and possibly the nasal cavity as well, has a cooling effect, whereas in warm air there is no such difference. In India, Crombie found in 15 careful observations that the mouth temperature was on the average 0·22° F. below that of the rectum, whereas Pembrey found the difference as much as 1·50° F. during cold weather in England. As regards the time the thermometer should remain in the mouth when taking temperatures, Sir Aldo considers that if nothing hot or cold has lately been placed in the mouth, and it has been kept closed for a short time, two to three minutes should suffice. In his experimental work in India, Crombie found that to get accurate results ten minutes were necessary in the well closed and dry axilla, eight minutes in the mouth, and three or four minutes in the rectum.

THE TECHNIQUE OF BIRTH CONTROL.

In a recent correspondence in the *Times* about the low birth-rate attention was drawn by Father Francis Woodlock, S.J., to the fact that fewest children occur in families whose eugenic value is highest, because the parents of those families practise birth control. "Don't blame Nature" writes Father Woodlock, "but give the Devil his due." This letter evoked a reply from Lord Dawson of Penn who, while urging the desirability of adequate parenthood for the well-being of husbands, wives, families, and the community, denied that the practice of contraception was necessarily diabolical. Few people, however, would deny that birth control, as practised in the community to-day, acts on the whole dysgenically. While the existing contraceptive methods are practicable by the better educated classes, they are ill-adapted to the use of unintelligent and improvident couples, or couples in which either partner drinks. Of all the psychological characteristics which are likely to promote fertility in England to-day, there is probably none more potent than habitual drunkenness. If the self-possession necessary to the taking of contraceptive precautions at the appropriate moment is lacking in either husband or wife an enhanced fertility will result. The dysgenic effects of contraception to-day are therefore intimately related to the problem of drunkenness in the slums. If these dysgenic effects are to be abolished, it is essential that a harmless and reliable contraceptive method should be discovered which will ensure a continuous period of sterility for a minimum of several weeks at a time, and which will demand no forethought on the part of wife or husband.

Such a method is practised in the clinics of Johann Ferch, in Austria. Another and quite different method was described by Dr. Ernst Gräfenberg and Dr. Norman Haire at the Third International Congress of the World League for Sexual Reform, which met in London last week. The method consists in the insertion into the body of the uterus of a small silver spiral ring which is left in situ for a year. Dr. Gräfenberg laid stress on the difference between his method and those involving the insertion of foreign bodies into the cervical canal, by which ascending infections are facilitated. He claims that he has used his method upon over 1100 women, that as long as the genital tract is healthy when the coil is inserted sepsis never ensues, and that sterility is never caused. In fact, the coil has several times been inserted as a treatment for sterility, and the woman conceived after its removal. According to Dr. Gräfenberg, the endometrium has but one response to mechanical stimulation—namely, hypertrophy. The hypertrophy caused by the coil is such that the fertilised ovum is incapable of embedding itself and conception cannot take place. Though this hypertrophied endometrium is shed at each menstruum neither menorrhagia nor dysmenorrhœa is caused. The coil never embeds itself in the uterine wall, and the incidence of neoplasia is no greater in his series than in the normal. The theoretical considerations which underlie Dr. Gräfenberg's method do not commend themselves to orthodox medical opinion in this country. Nevertheless, his paper was keenly discussed at the conference, and deserves the most impartial consideration. Dr. Haire also drew attention to this method in his paper. He pointed out that the Russian observers believe that its efficacy depends on a physico-chemical change which prevents fertilisation of the ovum. In his opinion it might well be that the Russian view and Dr. Gräfenberg's view were both correct.

Further evidence as to the practicability of the use of existing contraceptive methods by proletarian women has been submitted at a medical conference held on July 10th at the invitation of the North Kensington Women's Welfare Centre. Brief reports in response to a questionaire were submitted by medical officers from nine birth control clinics throughout the country and the following resolution was passed. "This conference . . of medical officers of birth control clinics . . . considers that a regular examination with a speculum is essential before a method of conception control is recommended; and it urges the committees of such clinics to afford facilities to their medical officers to make this examination." As one of the medical officers present said, the speculum examination makes the difference between a scientific and a philanthropic approach to contraception. Follow-up systems are by no means universally in use at these clinics, so that it is difficult to appraise the practicability of the methods advised. A significant note, however, is made by Dr. Kathleen Slim, of Wolverhampton, who says that "50 per cent. of women that were fitted with Dumas pessaries were advised by the doctor to use soluble pessaries also, and one box was given with the initial outfit. With two exceptions no one has renewed the supply." At Wolverhampton also Semori tablets were used in cases in which patients had a pronounced objection to using a rubber pessary. Semori is a froth-producing substance, made in Germany, for which powerful germicidal powers are claimed. It was too soon, however, for an opinion to be given as to the results. Though the patients are asked at their first visit to return after a week and then every six months, all the clinics appear to lose touch with a number of them.

So far as they go, the figures submitted at this conference support the conclusion of Mr. Norman Himes, who made a careful statistical survey of British birth control clinics in 1927. This conclusion was that the methods then taught were not satisfactorily practicable by the least desirable elements of the population, whose fertility is most burdensome to the State. The importance of discovering a really reliable contraceptive, which is also harmless and fool-proof, will therefore be grasped by everyone who shares Father Woodlock's sociological in contrast to his theological opinions.

Opening of the Medical Schools.

IN connexion with the opening of the session at the London Medical Schools, the following arrangements are announced :—

Charing Cross Hospital.—The prizegiving will be held at the hospital at 4.30 P.M. on Oct. 5th. The annual dinner will be held at 7 for 7.30 P.M. at Gatti's Restaurant, Strand, Dr. J. M. H. MacLeod presiding.

Guy's Hospital.—The formal opening of the winter session will take place on Oct. 1st at 3 P.M. at the hospital, when Sir Humphry Rolleston will delive· an address on Medical Societies as Educational Factors. The treasurer of the hospital, Mr. F. P. Whitbread, will preside.

King's College Hospital.—The opening of the centenary session will take place at the Medical School, Denmark Hill, London, S.E., on Oct. 2nd, at 2.30 P.M. Lord Gorell will preside, and Sir Gregory Foster will deliver the introductory address.

London Hospital.—The annual dinner will be held at the Mayfair Hotel on Oct. 17th at 7.30 for 8 P.M., Mr. Hugh Lett presiding.

Royal Free Hospital.—The inaugural address on the Return of Woman to Medicine will be given on Oct. 1st, at 3 P.M., by Dr. Jane Walker, who will present the prizes for the session 1928–29.

St. Bartholomew's Hospital.—The annual old students' dinner will be held in the Great Hall of the hospital on Oct. 1st, at 7 for 7.30 P.M., Sir Frederick Andrewes, F.R.S., presiding.

St. George's Hospital.—The annual prize distribution will take place in the board room of the hospital on Oct. 1st at 3 P.M., when an inaugural address entitled Doctor and Patient will be delivered by Dr. Edmund Spriggs. The annual dinner will be held at the Hyde Park Hotel, Knightsbridge, on the same day at 7.15 for 7.45 P.M., Dr. D. Cotes-Preedy, K.C., presiding.

St. Mary's Hospital.—The annual dinner will be held at the Trocadero Restaurant on Oct. 4th at 7 P.M., Sir John Broadbent presiding. The annual post-graduate course, of which a detailed programme will shortly be available, will begin on the same day, and will be continued during Oct. 5th and 6th.

St. Thomas's Hospital.—The old students' dinner will be held at St. Thomas's House, Lambeth Palace-road, at 8 P.M., on Oct. 4th. Dr. H. G. Turney will preside.

Middlesex Hospital.—Dr. E. A. Cockayne will deliver an introductory address entitled Life's Endless Chain at Queen's Hall, Langham-place, W., on Tuesday, Oct. 1st, at 3 P.M. Mr. Samuel A. Courtauld, vice-president of the hospital, will preside and will distribute the prizes gained during the past year. The wards, medical school, and research department will be open for inspection after the ceremony ; also the new west wing of the hospital, which is now nearly ready for occupation. On the same evening, at 7.30 P.M., the annual dinner will be held at the Savoy Hotel, Mr. A. E. Webb-Johnson presiding.

University College Hospital.—The annual dinner of past and present students will be held at the Hotel Cecil on Oct. 25th, at 7.30 P.M. The chair will be taken by Dr. E. A. Barton.

Westminster Hospital.—The inaugural address will be delivered in the board room of the hospital at 3 P.M. on Oct. 1st by Dr. F. N. K. Menzies. The subject will be the Future Relationship of Public Authorities to the Voluntary Hospitals. The annual dinner of past and present students will take place at Grosvenor House, Park-lane, on Oct. 1st, at 7 for 7.30 P.M., Mr. Stanley Dodd presiding.

Pharmaceutical Society of Great Britain. — The inaugural address of the 88th session of the School of Pharmacy will be given on Wednesday, Oct. 2nd, at 3 P.M., by Dr. Henry H. Rusby, professor of materia medica in the College of Pharmacy, New York University.

The Clinical Interpretation of Aids to Diagnosis.

A Series of Special Articles contributed by Invitation.

XLIV.

INTERPRETATION OF THE WASSERMANN REACTION IN ADULTS.

PART I.*—INDICATIONS, METHODS, AND NOTATION.

No test in clinical pathology has been more abused than the Wassermann reaction, but its value is becoming more and more recognised, and its employment consequently increased. Few realise the prevalence of syphilis in our adult population—10 per cent. would probably be a conservative estimate.

Indications for a Wassermann Test.

The indications for submitting a patient's blood to the W.R. are : (1) absolute ; (2) relative.

(1) *Absolute.*—(*a*) Cases where syphilis is definitely diagnosed—by finding the *Tp. pallidum* or otherwise.

(*b*) All chancres and abrasions of the genital organs following illicit sexual intercourse. In all cases of suspicious sores where the *Tp. pallidum* cannot be found, the blood, if negative, should be tested weekly for at least six weeks, unless a positive result is obtained earlier.

(*c*) The presence of a rash which does not conform to any non-syphilitic skin lesion, with or without history of possible infection.

(*d*) Chronic swellings, ulcers, gummata, aneurysms, and cerebral tumours where syphilis cannot be absolutely excluded.

(*e*) Cases where the symptoms and signs point to a diagnosis of G.P.I. or tabes.

(*f*) Cases where syphilis is suspected or a risk of contracting it has been run.

(2) *Relative.*—(*a*) All cases of chronic ailments which do not respond to appropriate treatment.

(*b*) Patients showing myocardial weakness, especially if under 60 years of age.

(*c*) In angina pectoris, especially if occurring before the age of 40.

(*d*) All cases of gonorrhœa. (The patient may have contracted syphilis at the same time, and have an intra-urethral chancre.)

In this connexion it is important to remember that syphilis may simulate almost any chronic disease, and syphilis of a viscus may produce symptoms and signs of a failure of that organ to perform its normal functions as, for example, in diabetes, nephritis, cirrhosis of the liver. It may be pointed out here, though it will be discussed more fully later, that a positive W.R. does not necessarily mean that all or any of the symptoms are due to syphilis, whilst a negative (especially an isolated test) does not exclude syphilis.

The Choice of Methods.

Much of the odium cast upon the W.R. has been due to the large number of modifications of the original test employed by different workers, and to the fact that the carrying out of the test is frequently delegated to insufficiently skilled workers, often unqualified laboratory assistants. Stokes[1] says: "Few laboratory procedures involve more variables and factors known and unknown than the W.R. Not only do the reagents employed vary in strength so that they must be repeatedly and frequently titrated to determine their activity, but every step must be subject to control, and may vary under the most unsuspected influences. It goes without saying

* Part II., on Positive Results, will appear next week.

[1] Modern Clinical Syphilology, W. B. Saunders Company, 1926.

that a high degree of technical accuracy in the handling of the reagents is essential, and this part of the work cannot be entrusted to inexperienced technicians with satisfactory results."

The W.R. should mean a test carried out more or less in accordance with the original technique, using inactivated patient's serum, serum containing fresh complement, "antigen," red corpuscles, and hæmolytic amboceptor; these should be derived from *different* sources and a separate hæmolytic system should be used. Since the reaction is a quantitative one the titre of the reagents ought, within practicable limits, to be accurately known. Many of the methods employed are "short cut" ones—e.g., making use of the natural complement present in every fresh serum or of the natural antisheep hæmolytic amboceptor—but since the titre of these substances is not known the results are not always reliable. Admittedly many of these "short cut" methods are more sensitive than the original, but in view of the risk of non-specific results they should be used as complementary to, not in place of, the original method. They may be useful also for estimating the effect of treatment or as criteria of cure rather than for diagnostic purposes.

Four reliable methods of carrying out the original reaction are described and recommended for official use by the Medical Research Council,[2] and of these the most generally performed is No. 1 method, by which many tens of thousands of tests were performed before, during, and immediately following the war at Rochester Row Military Hospital, where they were carefully checked from the clinical side. Moreover, this test gave the most satisfactory results of all the methods of performing the W.R. discussed at the recent International Congress at Copenhagen.

The Wassermann is essentially a test which must be very carefully controlled. The pitfalls are numerous and mistakes easy. Unless the serologist adopts a uniform technique errors will creep in. Consequently laboratories where large numbers of tests are carried out, and where the results are carefully checked by the clinician, will tend to furnish more reliable results than isolated laboratories performing small numbers of tests at comparatively long intervals. The M.R.C. recommended that where tests are carried out for official purposes not less than 100 tests per week should be performed, preferably in batches of about 50.

It is most unfortunate that no general standardisation of the W.R. has been found possible, but seeing that so far no one method has been able to oust all the others it seems probable that the method employed in the largest number of cases, adequately checked, will give the most reliable results. Moreover, since the various reagents on the market vary very much in potency and reliability, it follows that a large, well-equipped laboratory which makes its own reagents will have a considerable pull over a small one when they have to be purchased from outside.

Notation.

With the large number of methods employed there are of necessity many notations. Some use ++++, +++, ++, +, and − or negative to indicate strongly positive, moderately positive, weakly positive, doubtful, and negative results respectively. Others employ numerals from 0 to 4 to indicate the amount of hæmolysis in the various tubes of the reaction; thus Kolmer uses 4 4 4 4 4 to indicate a strong positive, 4 4 0 0 0 to indicate a moderate positive, and 0 0 0 0 0 to indicate a negative. The method most commonly employed in this country is that recommended by the Health Section of the League of Nations: this consists of ++, +, ±, − to indicate strongly positive, positive, doubtful, and negative respectively. In any case it is a sound plan for the pathologist in giving a result to amplify the report by stating in brackets after his notation sign the words applicable to the result—e.g., ++ (strongly positive); ± (doubtful).

[2] Medical Research Committee Special Report Series, No. 14, 1921.

Technique of Taking and Forwarding Specimens.

Varying amounts of blood serum are required for the performance of the W.R. according to the method employed. Generally 1 c.cm. of blood or 0·25 c.cm. of serum is the minimum amount required, but most pathologists will be grateful to the clinician who sends a more than adequate supply; few patients are any the worse for losing 5, 10, or even 20 c.cm. of blood, and an ample supply of serum enables the test to be repeated if necessary, or confirmatory flocculation tests to be carried out.

Much the best method of obtaining the blood is by venepuncture, which in adults is usually simplicity itself, though the blood may be obtained by pricking the finger or lobe of the ear.

Venepuncture.—For venepuncture a sterile all-glass or Record syringe, and a fine sharp hollow needle are advisable. The syringe should be rinsed out with sterile physiological saline before use, especially if it has been sterilised with spirit or by boiling. Spirit may interfere with the reaction, and water present will cause more or less hæmolysis of the blood, and so discolour the serum. A good specimen is more likely to furnish a satisfactory result than a bad one.

The patient should be *seated* or *lying down* with the arm lying on a small table, palm uppermost. A tourniquet, consisting of a length of rubber tubing, is fixed round the upper arm and held by the patient, or tied in a half bow so that it can easily be released with one hand by the operator. A prominent vein over the antecubital fossa is chosen, and the skin over it painted with tincture of iodine: in this area the veins are comparatively fixed, and do not tend to slip away from the point of the needle. If the veins do not stand up well the patient should be instructed to hang the arm down and open and clench the fist, finally keeping it closed, or the arm may be immersed in warm water for a few minutes. The tourniquet should be sufficiently tight to make the veins stand up but not so tight as to obstruct the arterial circulation. The needle is attached to a syringe, preferably having the nozzle situated close to the periphery of the distal end (not in the centre, as in the ordinary type of syringe): this arrangement enables the needle to be held more in line with the vein. A point is chosen immediately over or just to one side of the vein; the skin is first punctured, then, when the point of the needle is located under the skin and over the vein, it is pushed on and will enter the vein with a well-marked but indefinable sensation of having overcome a slight resistance. The advantage of doing the puncture in two stages is that there is less likely to be an escape of blood following withdrawal of the needle. Sufficient blood is now withdrawn, the tourniquet released, the needle withdrawn, a pad held firmly over the site of puncture, and the patient instructed to hold his arm *straight* up vertically for a minute or so. No dressing is required unless blood oozes when the arm is allowed to hang down. The blood should be transferred to a sterile test-tube immediately and not allowed to clot in the syringe.

A simpler method is to use a needle to which a short length of rubber tubing is attached; the needle is held between the thumb and first finger, whilst a test-tube into which the rubber tubing leads is grasped by the ring and little fingers. This obviates the use of a syringe—but entails the use of a wide-bore needle, as otherwise the blood may not flow freely. Many forms of apparatus for taking the blood are on the market, but the above method is rapid and simple.

Serum by Post.

In cases where the blood has to be sent through the post, and/or when the test is not likely to be carried out within 24 hours of taking the specimen, it is preferable to send serum only, not whole blood. After the blood has stood in the test-tube for a few hours the serum separates quite readily; if it does not, a platinum wire or glass rod should be used to separate the clot from the sides of the tube, and the tube should be placed in warm water for a short time. When the

serum has separated it should be poured out into a small sterile glass tube, and the latter tightly corked. If whole blood is sent through the post, and especially if the weather is warm, hæmolysis is apt to occur; this may vitiate the test or render its performance impossible. The specimen should be kept sterile as far as possible; infection with organisms, if heavy, may render the serum so anticomplementary that the test will fail and the pathologist will be unable to furnish a report. Though it is wise to test a specimen of serum as soon as possible, preferably within a day or two, a satisfactory result can be obtained after several weeks or even months. I have tested sera sent from West Africa, India, and Mesopotamia by ordinary post.

When sending specimens of blood or serum through the post it is necessary to comply with the Post Office Regulations on the subject. The specimen must be (1) sent by letter, *not* parcel, post; (2) enclosed in a receptacle securely closed and placed in a box in which it cannot shift about; (3) surrounded by a sufficient quantity of some absorbent material, such as cotton-wool or sawdust, so as to prevent any possible leakage; (4) marked "fragile, with care, pathological specimen."

It is most desirable that all sera should be accompanied by clinical details giving a short account of (*a*) situation and character of the lesion; (*b*) length of time the disease has existed; (*c*) treatment administered (if any), both local and general; (*d*) results of previous tests with dates; (*e*) any special remarks. This information enables the pathologist to give a much more satisfactory opinion as to the interpretation of the reaction—an opinion which should always be expressly asked for.

T. E. OSMOND, M.B. Camb.,
Pathologist, Venereal Diseases Dept., St. Thomas's Hospital, London.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Comdr. (D.) H. M. Meek is placed on the Retd. List at his own request.

Surg. Lt.-Comdr. (D.) J. F. Place to be Surg. Comdr. (D.).

Surg. Lts. E. C. Davis, A. L. McDonnell, and S. G. Weldon to be Surg. Lt.-Comdrs.

The following appointments are notified: Surg. Comdrs. C. E. Greeson to *President*, and E. St. G. S. Goodwin to *Victory*.

ROYAL NAVAL VOLUNTEER RESERVE.

The following appointments are notified: Surg. Lt. A. R. Thomas to *Victory*, for R.N. Hospital, Haslar, for training, and Proby. Surg. Sub-Lt. R. H. Wheeler to *Pembroke*, for R.N. Barracks, Chatham, for training.

ROYAL ARMY MEDICAL CORPS.

Capt. R. R. Evans to be Maj. (Prov.).

Lt. (on prob.) P. D. Johnson resigns his commn.

ARMY RESERVE OF OFFICERS.

Lt.-Col. H. V. Bagshawe, having attained the age limit of liability to recall, ceases to belong to the Res. of Off.

SUPPLEMENTARY RESERVE OF OFFICERS.

Lt. A. Hemingway to be Capt.

TERRITORIAL ARMY.

J. H. B. Livingston (late Offr. Cadet, Glasgow Univ. Contgt., Sen. Div., O.T.C.) to be Lt.

DEATHS IN THE SERVICES.

Surgeon Captain Richard Miller, R.N., retd., who died after an operation on Sept. 12th at the age of 67, was a graduate of Trinity College, Dublin, and entered the Royal Navy as surgeon in 1887. Two years later he received the Bronze Medal of the Royal Humane Society for jumping overboard from the *Iron Duke* off Malta, and going to the assistance of a corporal of marines. In 1903 he was promoted to fleet surgeon, and, after service in battleships, was placed in charge of the Royal Hospital at Yarmouth. In 1916 he became medical officer of the battle cruiser *Princess Royal*, and a year later retired on age limit with the rank of surgeon captain.

Special Articles.

BACILLARY DYSENTERY IN AN INDUSTRIAL AREA.

BY J. A. CHARLES, M.B. DURH., M.R.C.P. LOND., D.P.H.,
DEPUTY MEDICAL OFFICER OF HEALTH, NEWCASTLE-UPON-TYNE;
AND
S. H. WARREN, M.R.C.S. ENG., D.P.H.,
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THE English text-book descriptions of bacillary dysentery almost always present to us a disease of great antiquity, the concomitant and curse of our multitudinous military operations from Agincourt to Gallipoli, an endemic disorder which nowadays limits its activities, for the most part, to the tropical and subtropical zones. They suggest that its presence in these islands is infrequent, showing itself occasionally in sporadic cases, in outbreaks affecting mental institutions and their inmates, or in larger epidemic manifestations, such as the Glamorgan outbreak of 1921 where infected water or milk is the chosen medium of dispersal. Even the causal organisms are indifferently differentiated, and while due regard is paid to the toxicity of the bacillus of Shiga, those other members of the group which are associated with the names of Flexner and Sonne are regarded as being relatively avirulent and often almost non-pathogenic. These facts are insufficiently understood, despite the work of Nabarro,[1] and the Aberdeen[2] and Glasgow[3] investigators.

It is our intention in this article to combat certain of these conceptions, and to endeavour to demonstrate that in some parts of Great Britain bacillary dysentery is not a rare and spectacular occurrence, but a fact of everyday life.

History of the Investigation.

Proven cases of bacillary dysentery have been discovered from time to time during the last eight years in Newcastle and the two northern counties of Northumberland and Durham, and records of the isolation of the causal organisms are in existence in the Public Health Department of the University of Durham College of Medicine Bacteriological Laboratory. The present detailed inquiry dates from March, 1928, when three members of a Newcastle household fell ill with symptoms which suggested a food poisoning infection. Bacteriological investigation showed that these mild cases were due to the *Bacillus dysenteriæ* Flexner, Type Z. Within a month two sudden deaths occurred in boys aged 8 and 9 years respectively, and post-mortem and bacteriological examination proved that the cause of death in each case had been a dysenteric infection by a Flexner organism.

In consequence of these facts the medical practitioners of the city were circularised and requested to notify to the medical officer of health any cases where signs and symptoms suggestive of dysentery were present, with a view to their thorough investigation and hospitalisation if necessary. Up to June 30th of the present year this request had resulted in the notification of some 355 cases of suspected dysentery. Many of these were discarded on clinical or bacteriological grounds, but from this source and through other channels of inquiry—e.g., inquests, &c.—information was obtained of 141 cases of true bacteriologically proven bacillary dysentery.

The 111 positive and 80 suspected cases which were admitted to the City Hospital for Infectious Diseases, during the period under review (March, 1928, to June 30th, 1929), afforded ample material for clinical and bacteriological investigation, the results of which are synopsised in the following sections.

Clinical Features.

Primarily a distinction must be made between the ordinary simple case, which though of varying severity yet progresses steadily to convalescence and cure, and the acutely toxic one, in which onset, the development of symptoms, and death follow one another so swiftly that the whole course of the disease requires but 24 hours for its completion. The ten fatal cases in this series were all examples of this fulminant entero-colic dysentery.

In the mild cases the onset is usually gradual. A simple malaise and headache develop, and are occasionally associated with vomiting. There is fever, and the temperature reaches 100° or 101° F. Abdominal pains of colicky type follow, and in the course of a few hours these are succeeded by the passage of a few loose motions. After the bowel has been emptied of its fæcal contents, the stools rapidly increase in number and mucus and blood make their appearance. The presence of these in the stool may take one of several forms, occurring either as the true red-currant jelly stool of dysentery, or a watery mucous motion in which float shreds of blood-clot, or the grumous stool flecked with mucus and blood. All these have been observed, and the presence of dysentery bacilli in them confirmed. The diarrhœa in certain cases is almost continuous, and 20–30 stools in the 24 hours are not infrequent. Throughout this stage the colicky pains are invariably present, and relief follows the evacuation of the bowel. Tenesmus, particularly in adults, is a common symptom, while pain on deep pressure over the abdomen, except in the region of the pelvic colon, is comparatively rare. Enlargement of the spleen has been observed in not more than 10 per cent. of cases. Furring of the tongue is generally present. The appearance of the patient varies according to the severity of the attack, but is usually one of distress and discomfort. The commencement of treatment results, almost immediately, in the disappearance of the blood and mucus from the stool; the pyrexia gradually diminishes until coincident with the improvement in the intestinal condition, it ceases about the eighth day of the disease along with the diarrhœa. Complications have been very few. Nephritis and broncho-pneumonia were each found as a sequela on one occasion, though albuminuria during the early stage of fever was relatively common. In one extra-mural case, which was reported to us, there was a definite polyarticular arthritis. The bronchitic signs which the Aberdeen observers associated with infection by the Sonne bacillus were never met with. Personally, we found nothing to differentiate between the cases caused by the several types of dysentery organisms, except that Sonne infections appeared on the whole to be milder, less frequently associated with the cardinal signs of pyrexia, tenesmus, and blood and mucus, and more liable to present the features of a mild diarrhœa with semi-solid rather than liquid stools.

Only one patient suffered a relapse—and this was while she was still in hospital. Further, although multiple, more or less simultaneous cases from individual houses have been frequently encountered, there has been no evidence of "return" cases. Bacteriological examination of a certain number of patients after discharge from hospital has given negative results.

A few figures may be of interest. The average duration of pyrexia in all cases was seven days, with 2 and 16 days as the extremes of duration; blood and mucus in the stool were generally present for four days with recorded limits of 1 and 16 days; diarrhœa continued on an average for about a week, but was found in several cases for only two days and in one for 19 at least. Some idea, although admittedly only an approximate one, of the length of time during which the causal organism could be found in the stools, can be gathered from the fact that the average period from the outset of the attack to the ascertainment of the first negative stool was 19 days. On this basis the shortest period of infectivity was 9, and the longest —which practically amounted to a carrier state— 71 days.

Fatal Cases.

In fatal cases the onset is extremely sudden, and the symptoms are toxic rather than diarrhœic. Headache and vomiting are invariably present, the temperature at first may be as high as 102° or 103°, but even though the typical colicky pain, diarrhœa and blood and mucus may make their appearance, they are of little moment in the presence of the profound toxæmia, coma, collapse, and circulatory failure which develop so rapidly in these cases. A common history is that of a child well enough to attend school in the morning, who after dining at home, and feeling perhaps not quite so well thereafter, returns to school for the afternoon. After school he is sick, lies down, refuses his tea, and then appears to sleep. Later in the evening the prolonged drowsiness or a change in his colour attracts the parent's attention. A doctor is summoned, the patient removed to hospital, but even the most energetic treatment with stimulant and serum fails to rouse him, and death occurs within 18 to 24 hours of the onset.

Diagnosis.—Both in the mild and the fatal cases diagnosis has certain pitfalls. The commonest errors are to regard the condition in children as a non-infective enteritis, and in adults to suspect the presence of a true food poisoning infection. But other diagnoses such as intussusception, encephalitis lethargica, enteric fever have been made, and on two occasions a moribund and stertorous child has been admitted to hospital as suffering from laryngeal diphtheria. One particularly interesting case which was brought to our notice by Dr. J. W. Lickley, of the Fleming Memorial Hospital, was that of a child with a facial paralysis, due to a toxic neuritis, which had appeared as a sequel of a proved infection with Flexner dysentery.

Treatment.—The routine treatment of all simple cases has comprised rest in bed, light diet, colon lavage, and the administration of sodium sulphate in appropriate doses. Serum treatment with a polyvalent Shiga-Flexner serum has been employed comparatively freely. Its place in the therapeutics of our cases may be summed up quite shortly. Generally the mild cases as they occur in children do not require serum; the severer ones in adults yield quickly to its administration, and in the relief of symptoms, particularly of the tenesmus, it is remarkably effective; in the fulminant cases serum, however administered, has never succeeded in combating the toxæmia.

Post-mortem Appearances.

It will be remembered that all the deaths in the present series occurred in cases of the fulminant type of the disease, and the findings of the ten post-mortem examinations performed differed but slightly from one another. No case showed the signs of chronic dysentery, nor yet of the ordinary acute type of the disease. In every instance the pathological findings indicated an inflammatory condition of both ileum and colon—the entero-colic type of the disease—and in the majority the enteritis predominated. The changes were most marked in the lower third of the ileum, though in one case it was the upper part of the jejunum which appeared to be chiefly affected. The blood-vessels in the wall of the gut were generally engorged, and on opening the peritoneal cavity it was easy to locate the portions of bowel involved by their congested appearance. Of actual peritonitis there was never any trace. The appearance of the bowel wall internally was invariably that of a folliculitis, passing on to follicular ulceration, but the Peyer's patches, though prominent and hyperæmic, were rarely ulcerated. The condition of the colon was similar to that of the small intestine, though to a less degree. Neither large nor small bowel was ever found to be the seat of chronic thickening, though recent œdema was constantly present. In several cases the mesenteric glands were found acutely enlarged, and in one case there was a slight degree of splenomegaly. Toxic

changes were invariably present in the heart, kidneys, and liver.

Of the ten post-mortems, only one was negative bacteriologically, but from this case shortly before death a stool was obtained from which a Flexner organism was isolated. All the others were positive, and the causal dysenteric organism was isolated from one or more sources. The results of the bacteriological examinations of the specified organs are shown in Table I.

TABLE I.

Organ.	P.M. specimens examined.	Positive for dysentery organism.
Stomach	5	0
Small intestine ..	10	5
Colon	8	6
Spleen	7	1
Liver	2	1

It is interesting to note that though gross pathological changes were more frequently observed in the small intestine, a higher proportion of positive cultures was obtained from the colon.

Epidemiological Features.

In an interim report on 22 of the present cases which has been published by one of us,[4] a comprehensive review was made of a number of possible epidemiological agents in the causation of the disease, and the relation of water, milk, milk products, ice-cream, prepared meats, shell-fish, watercress, salads, flies, epizoötics, school attendance, and sanitary conditions was carefully investigated. In view of the fact that the results of this critical review were entirely negative—a conclusion which has been borne out by continued investigation on more recent cases—it is not proposed to discuss these individual features further. Some consideration of certain other factors is, however, necessary.

Age and Sex Distribution.—Table II. gives the age distribution of the 355 suspected cases, and the age, sex, and mortality distribution of the 141 proved cases.

TABLE II.

Suspected Cases of Dysentery.

Under 1 yr.	1 yr., under 2	2–5	5–15	15–25	25–45	45–65	Over 65	Total.
25	60	126	86	14	36	6	2	355

Proved Cases of Bacillary Dysentery.

M. ..2(1)	16	26	20(6)	3	7	3	—	77(7)
F. ..3	12(1)	20(1)	18(1)	1	8	2	—	64(3)
Total 5(1)	28(1)	46(1)	38(7)	4	15	5	—	141(10)

M. = Male; F. = Female. (The figures in parentheses which are included in numbers by which they stand indicate fatal cases.)

Several facts are at once apparent—viz., the comparative rarity of the infection under the age of 12 months, the heavy incidence on children between 2–5, the lower death-rate in females, and the very high mortality amongst boys from 5–15. Further, it is evident that adults are by no means immune from infection. It is probable that the encouragement which has been given to breast-feeding of infants in Newcastle accounts for their freedom from the disease, for of the five in the first age-group who contracted the disease only one was breast-fed. Above the age of 1 the same adherence to the principles of sound dietetics is lacking. There is a tendency to simplify the domestic arrangements by giving the toddler "the same as we," which results in his regarding any stray article of food, however broken or dirty, as suitable material for ingestion. The freedom of girls from the presumably massive infections which are responsible for the toxic dysenteries so common in boys may be due to the more delicate habits of the female, or to a statistical illusion which a larger number of cases will remove.

Seasonal Incidence.—As will be seen from Table III., cases of bacillary dysentery have occurred throughout the year, though an increased incidence is apparent in the warmer months—e.g., August, September, 1928, to April, May, and June, 1929. Our figures, however, are not free from the error that as the knowledge of the condition extends amongst medical practitioners so also do the number of positive cases increase. Accordingly, it is impossible to make any strict comparison for example between the incidence of dysentery upon children under the age of two and the deaths registered under "enteritis" in the same age-group, and so obtain figures which might show the presence or absence of any connexion between the two.

Distribution of the Cases.—The 141 positive cases occurred not only singly, but also as multiple cases in individual households.

There was one hospital outbreak made up of seven cases, four domiciliary groups of three each, 13 where two patients were affected, and 96 single cases. Among the latter, however, there were 16 which gave histories of associated cases of diarrhœa in the same dwelling, usually before the discovery of the positive case. These cases were often highly suggestive of dysentery, but were either not available for examination early enough or were bacteriologically negative.

Mention may be made here of certain facts which will be considerably amplified later. No fewer than six types and varieties of dysentery organisms have been found active in the causation of the disease in Newcastle. This alone is highly suggestive of the endemicity of the disease, provided always that it can be shown the types do not change one into the other. The first point of evidence to suggest that the types do remain constant and stable is the persisting specificity of the domiciliary infection. By this we mean that whenever multiple cases have occurred in a dwelling the same type of organism has been isolated from every case in that house.

Out of 17 such domiciliary outbreaks, there was only one in which this principle did not hold, and in this instance a newly arrived lodger who had been roughing it in hedges and lodging-houses developed a Flexner W infection in the same house in which a child had previously had a Flexner Z dysentery. The circumstances of the lodger, and the negative results of further investigation of the child, led us to regard this as a coincidental rather than as a transmitted infection.

The usual sequence of the disease in a household is interesting. Simultaneous onset in several of the members is rare. Most commonly the illness of one child is followed a little later by the classical signs in another, and lastly the mother, who has been doing the nursing, falls sick herself. The hospital outbreak of seven cases already referred to occurred in a female diphtheria ward, and was apparently due to the admission of an undetected Sonne carrier. Here, again, there was no simultaneity of attack, but only the customary case-to-case infection, which was followed by the isolation of a Sonne bacillus in every instance. The disease was widespread throughout the city, and 17 of the 19 wards yielded cases, while the unaffected districts were high-class residential suburbs.

One ward—in large part owing to the keenness of its medical practitioners—supplied 51 cases spread over the 16 months' investigation. Twenty of these occurred in a large housing estate of 24 blocks of flats which had been built during the war. This property, by name Rochester Dwellings, with its 384 dwellings and 1800 inhabitants, was the subject of intensive research. Three distinct organisms were associated with the 20 caess occurring there, and the principle of the persisting specificity of domiciliary infection not only applied, but in several instances over a period of months, has shown itself true for whole blocks of flats.

Lastly, a word may be said as to the occurrence of bacillary dysentery in the surrounding neighbourhood. Ten of the 141 cases notified were extra-mural cases, which had been admitted from towns and villages in Northumberland and Durham. In only one of these cases could infection be traced to Newcastle. During the same period the laboratory records show that 14 more cases were bacteriologically diagnosed from seven different sources in the two counties. Evidence

of sporadic outbreaks, both in the city and the neighbouring counties, has gradually accumulated. From the beginning of 1922 to the commencement of the present investigation, there are records of 12 outbreaks, reports on three of which have been published by Breakey and Clayton,[5] Clayton,[6] and Warren.[7] The organisms implicated were *B. dysenteriæ* Flexner (various types) on six occasions, a definite Sonne bacillus (1926), and two almost certainly identical organisms which were isolated earlier (1922 and 1923), and regarded as inagglutinable Flexners, the original strain of the Newcastle bacillus, an indefinite *B. dysenteriæ* Schmitz, and an atypical Shiga organism.

Overcrowding.—There is no need to stress the importance of overcrowding, with its manifold opportunities for personal contact, in the spread of infectious disease. The census definition which lays down that overcrowding is present when the number of persons per room in a dwelling exceeds two is the simplest for our purpose, and in 1921, on this basis, 33·6 per cent. of the population of Newcastle were living under such conditions. Since that date 6000 new houses have been built and the general overcrowding has diminished, but in the case of the population from which the dysentery cases came, it was even worse than the average for 1921, for 52·6 per cent. of them came under the census definition. Further, of the eight Newcastle families amongst which fatal cases occurred, 94·6 per cent. of their members were overcrowded. Actually the average number of persons per room in those households was four.

Hospitalisation of cases of acute dysentery is of obvious practical value in many ways, and not least because it removes a focus of infection from a house, and incidentally reduces the overcrowding. The following facts are put forward as being highly suggestive. In the first eight months of the present investigation there were 58 cases with eight deaths, occurring in 46 outbreaks, of which 10, or 22 per cent., were multiple. The corresponding figures for the last eight months were 83 cases with two deaths, occurring in 69 outbreaks, eight of which were multiple—a percentage of 12. Apart from these figures our feeling is that with the spread of an increased clinical consciousness of the disease among practitioners, and the better appreciation of the hospital facilities available, the multiple case-rate, and the case-mortality have steadily diminished.

Mode of Infection—Our conception of the spread of the infection is that it occurs through close and intimate contact of infecting persons with others or with their food, its preparation and service. The conditions under which many of our patients lived were such as made ordinary cleanliness very difficult, and the proper hygiene of the kitchen and food storage almost impossible. The actual sanitary conveniences of these families were good—apart from the fact that they were shared too frequently in common with others. Without doubt, the missed case of dysentery is the principal factor in the diffusion of infection. On several occasions we have obtained a history of an earlier case in a house, and confirmed it by agglutination tests, which invariably showed the same causal organism both in it and the later case or cases.

We have not found definite and conclusive evidence of the existence of carriers. In three instances, however, we have come across suggestions of their presence.

1. A case of enteric during the convalescent period yielded a stool containing Sonne bacillus, without history of recent attack or exposure to infection.

2. The seven cases of Sonne dysentery in a female diphtheria ward occurred consecutively amongst convalescent patients, in whom again both recent attacks and exposure to infection could be ruled out.

3. One patient with Flexner "Z" dysentery (and probably a double infection with Sonne also) did not give a negative stool until 71 days from the onset. For the last eight weeks of this period he was entirely free from symptoms of any description.

Bacteriological Data.—From 471 specimens submitted to examination, dysentery bacilli were isolated on 210 occasions. It is necessary to observe that the number of examinations carried out was the absolute minimum necessary for purposes of diagnosis, and for determining whether a patient awaiting discharge from hospital was free from infection. If a single stool examination did not confirm the clinical diagnosis no further examination was made. This voluntary restriction of the field of inquiry undoubtedly prevented a larger proportion of positive results being obtained from the 355 cases notified.

After a clinical cure had been established, one negative stool was regarded as sufficient to enable a patient to be discharged from hospital. This policy seems to have been justified by results. Only one relapse occurred, and even though discharged cases are still kept under observation, and attempts made to associate them with new notifications, no evidence of any return case is available as yet.

Specimens from cases of chronic bacillary dysentery were not met with. Generally speaking the stools obtained from acute cases of the disease consisted of watery muco-pus, and more frequently of muco-pus, sometimes with blood and often bile-stained. The convalescent stool was usually composed of fæcal material. The negative results of microscopical examination for amœbæ, intestinal parasites and cysts, led to the discarding of this form of examination at an early date.

The actual diagnosis of bacillary dysentery was made by the isolation of a recognised dysentery organism from the fæces. Tests for agglutination in human sera were not found to give marked and clear-cut results, and their use was limited to confirming whether a cured clinical but non-bacteriologically proven case with a suggestive history had really been suffering from dysentery, and to ascertaining whether such a case occurring early in a domiciliary outbreak had been infected with the same type of organism as was isolated later from other members of the family.

The routine method of examination consisted in washing pieces of muco-pus in normal saline, and then sowing two or three bile-salt lactose-peptone-neutral-red agar plates. All specimens, where food-poisoning was suspected, particularly from post-mortem cases, were also inoculated into brilliant-green peptone water, and subsequently plated as above after 24 hours' incubation at 37° C. This procedure of brilliant-green enrichment practically never resulted in the isolation of dysentery bacilli. On direct plates, however, the results varied from an almost pure culture of a dysentery bacillus to the presence of one single colony amid many coliform ones.

The dysentery organisms isolated belonged to the three main groups: (1) *B. dysenteriæ* Flexner; (2) *B. dysenteriæ* Sonne (III); and (3) the Newcastle bacillus. The various types were identified both by their biochemical reactions and serologically. Occasionally when there was some doubt, motility was tested, but this was not done as a routine, and in no instance was any of the three groups found to be motile.

Biochemical Reactions.—For this purpose the following peptone water sugars were used—glucose, lactose, saccharose, mannite, and dulcite. Litmus milk and peptone water for indol production were also employed.

The reactions of the three groups were as follows:—

(1) The Flexner group uniformly gave the recognised sugar reactions—acid with glucose and mannite, and no change in lactose, saccharose, or dulcite. In litmus milk slight acidity followed by alkalinity was the usual change, only varied by the milk occasionally not going definitely alkaline. Indol was produced by most of the strains, but just a few were definitely negative. All reactions were incubated for at least ten days.

(2) *B. dysenteriæ* Sonne III. All the strains which we have identified as belonging to this group have given uniform results in that they rapidly produced acid in glucose and mannite, and after incubation at 37° C. for at least 14 days, showed late fermentation of lactose and saccharose, acid production in milk, and non-production of indol. These findings confirmed the description of Kerrin,[8] except that maltose, dextrin, and zylose were not used. None of the strains appeared to belong to the *dispar* group of Andrewes.

(3) The isolation of the Newcastle bacillus as described by Clayton and Warren[9] has formed part of this investigation. Its biochemical reactions conformed to those given by these authors, and are as follows: Acid is produced in

glucose, and acid with possibly a little gas in dulcite after four or five days. Mannite, lactose, and saccharose give no change. (When lemco broth sugar media were employed, acid and gas were produced in glucose in 24 hours, and in dulcite in four to six days). Litmus milk remained unaltered, and no indol was produced.

Serological Investigations on all isolated organisms were also carried out, and no identification was made until this had been completed. In this work we received great assistance from Dr. W. M. Scott, of the Ministry of Health, who examined and confirmed the identification of the majority of our strains.

As regards the *Flexner group*, the serological races of these organisms as established by Andrewes and Inman[10] formed the basis of the typing of the strains isolated by us. The isolated organism was first subjected to a polyvalent Flexner serum, and if agglutinated, was then put up to the five type sera—V, W, X, Y, and Z. In our case simple agglutination with impure type sera was employed, and saturation tests were not used. Scott used chiefly pure specific type sera from which the group agglutinins had been removed. Such tests enabled us to confirm the biochemical reactions which placed these organisms in the Flexner group, and to separate them out into the various serological races, V,W, X, Y, and Z.

By simple agglutination we found a few W and X strains, which appeared to be more closely related to the Y group than is normal, but when subjected by Scott to specific type sera, these organisms all proved to be simple W or X strains.

In all, 109 Flexner strains were isolated and were distributed as follows: V, absent; W, 51; X, 8; Y, 1; and Z, 49. The only variation found in the Flexner group was that occasionally one met with an organism which agglutinated rather poorly, but even such a one could be typed. Further, a mixture of more than one type of Flexner organisms was never encountered in any specimen examined. This search for a multiplicity of Flexner types in one stool was not made as a routine, but from time to time all the colonies taken off a plate (4 or 5, as a rule, when possible) were put up for typing and were found to be identical. This was done with W, X, and Z strains.

The serological features of the *Sonne group* can be summarised as giving definite agglutination with Sonne III serum, and a negative reaction with polyvalent Flexner serum. At first we encountered the usual difficulty in getting recent strains of Sonne to agglutinate, but no difficulty was experienced later, when the significance of agglutination of the rough and smooth stages of the organism had been appreciated. A mixed rough and smooth serum obtained from Scott was of great use in quickly identifying this group, and a smooth serum prepared in the laboratory has been found so far to agglutinate all recently isolated cultures quite well.

The serological characteristics of the *Newcastle bacillus* have been described in detail in their second paper by Clayton and Warren.[11] In short, it may be said that although this organism is serologically distinct, it bears some relation to the Flexner group.

It is noteworthy that all the types isolated with the exception of Y were possessed of lethal powers to a greater or lesser degree. Their association with the ten fatal cases was as follows: Flexner W, 3 cases; X, 1; Y, 0; Z, 2; Sonne, 2; Newcastle bacillus, 2.

The seasonal incidence and distribution between the sexes of the various organisms are also recorded in Table III.

TABLE III.

Type of organism.	1928										1929						Males.	Females.	Totals.
	Mar.	Ap.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Ap.	May	June			
Flexner W ..	1(1)	1	2	—	2(2)	7	6	2	1	1	2	—	3	5	8	10	27(2)	24(1)	51(3)
,, X ..	1(1)	—	1	1	—	—	—	—	—	—	—	2	—	3	—	—	4(1)	4	8(1)
,, Y ..	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	1	—	1
,, Z ..	3	2	1	3	2	2	6	2	3(1)	2	2	1	4	6	8	2(1)	32(2)	17	49(2)
Sonne	—	—	3(1)	1	—	2	2(1)	1	4	1	—	—	5	2	—	5	11(1)	15(1)	26(2)
Newcastle bacillus	—	—	—	2(1)	—	—	—	1(1)	—	—	2	—	—	—	—	1	2(1)	4(1)	6(2)
Totals ..	5(2)	3	7(1)	7(1)	4(2)	11	15(1)	6(1)	8(1)	4	6	3	12	16	16	18(1)	77(7)	64(3)	141(10)

The figures in parentheses, which are included in the numbers alongside which they stand, indicate fatal cases.

Of a single case, these colonies when typed were all found to consist of one and the same strain of organism.

Attention is now directed to another series of observations. In 128 out of the 141 proven cases, the examination of the stools was repeated until a negative result was obtained. We found that—

96	patients	gave	1	pos.	stool	followed by	1	neg. stool.
17	,,	,,	2	,,	,,	,,	1	,, ,,
8	,,	,,	3	,,	,,	,,	1	,, ,,
2	,,	,,	4	,,	,,	,,	1	,, ,,
1	,,	,,	5		,,	,,	1	,, ,,

The type of organism remaining unchanged throughout the respective serial examinations.

Four patients gave variations in the types of organism isolated as follows:—

Patient.
Z 734 gave Flexner W, then Fl. Z, then neg. stool.
Z 341 gave Fl. Z twice, then Fl. W. once, then neg. stool.
Z 294 gave Fl. W twice, then Fl. X once, then neg. stool.
Z 251 gave Fl. Z four, then Sonne III once, then Fl. Z three, then neg. stool, which was repeated two months later.

There are thus 28 serial investigations where the same organism occurred two or more times, and four where there were variations. With regard to one of these four cases, we consider that the occurrence of Sonne III. in the middle of the course of the obvious Flexner Z case (No. Z 251) was indicative of mixed infection. As for the others we are not prepared to state whether they are examples of mixed infection, or of mutation, or even, possibly, of errors in technique. Our opinion is that these various Flexner types do not change one into the other, but maintain their identity in the same way as do the Sonne and Newcastle organisms.

Discussion.

We have still to speak of certain observations on the variability of the dysentery bacilli isolated from the 141 cases in the series. Two facts have already been mentioned. First, that where multiple domiciliary cases occurred, the group and type of the organism were the same for each individual case in the series; secondly, that when several colonies of dysentery bacilli were taken from a plate sown from the fæces

Conclusions.

(1) Bacillary dysentery is a relatively common disease. Our experience, together with those of Nabarro and the Glasgow and Aberdeen observers, suggests that in certain areas it is undoubtedly endemic. (2) Mild, severe, and fatal cases are all to be met with, and conform in the main to the classical types of the disease. (3) Its seasonal incidence is not limited to the warmer months of the year, and for this reason and because of its low attack-, and still lower mortality-rates among children below the age of two years, it does not appear to have any definite association with the infective summer diarrhœa of infants. The causation of this latter condition requires further and extensive research. (4) Six different organisms belonging to the Flexner, Sonne, and Newcastle group of dysentery bacilli have been found in association with the disease. It is not improbable that in other

areas the prevailing types may be different. (5) In view of the persistence of the same type of organism, (*a*) in multiple domiciliary cases, (*b*) in the examination of several colonies from a single plate, and (*c*) in the large majority of serial examinations from the same case, our opinion is that these various causal organisms breed true.

We beg to offer our thanks to Prof. Harold Kerr, medical officer of health, Newcastle-upon-Tyne, for the facilities for conducting this investigation which were so freely placed at our disposal, and to Dr. W. M. Scott, of the Ministry of Health, for advice and assistance in many ways too numerous to mention. This paper, moreover, would be incomplete without an acknowledgment of our indebtedness to Dr. F. H. A. Clayton, in conjunction with whom the inquiry was initiated.

References.

1. Nabarro, D.: THE LANCET, 1927, i., 460.
2. Fraser, A. M., Kinloch, J. P., and Smith, J.: Jour. Hyg., 1926, xxv., 453.
3. Wiseman, W. R.: Jour. Hyg., 1926, xxv., 483.
4. Charles, J. A.: THE LANCET, 1928, ii., 616.
5. Breakey, S. F., and Clayton, F. H. A.: THE LANCET, 1926, ii., 541.
6. Clayton: THE LANCET, 1927, i., 391.
7. Warren, S. H.: THE LANCET, 1927, i., 494.
8. Kerrin, J. C.: Jour. Hyg., 1928, xxviii., 74.
9. Clayton and Warren: Jour. Hyg., 1929, xxviii., 355.
10. Andrewes, F. W., and Inman, A. C.: Med. Res. Council's Special Report, 1919, No. 42.
11. Clayton and Warren: Jour. Hyg., 1929, xxix., 191.

THE STATE OF THE PUBLIC HEALTH.

(*Concluded from p. 574.*)

WE have already dealt with the general lessons of the Annual Report[1] of the Chief Medical Officer of the Ministry of Health for 1928 (August 31st, p. 480), and with the sections devoted to maternal and infant welfare, and the insurance medical service. The following is a brief summary of the remaining sections of the report.

The Local Government Act.

The Report discusses the evolution of the poor-law and the development of public health administration in England since the Reform Act of 1832. It urges medical officers of health to be prepared to advise their councils on such general questions as:—

1. The desirability of discharging certain of the transferred functions through some committee other than the Public Assistance Committee, to which most of the transferred powers otherwise stand referred or may be delegated.

2. The advisability and practicability of providing certain forms of medical assistance under the Public Health and other Acts rather than under the Public Assistance Committee and the Poor-law Act.

3. Whether in districts where it is impracticable to declare that all assistance for the sick should be provided under the Public Health Acts, it may be desirable to appropriate one of the transferred institutions to hospital purposes and to administer it under one or other of these Acts.

4. The desirability in counties which have decided to provide certain forms of relief under the Education Act, 1921, or the Maternity and Child Welfare Act, 1918, of delegating the provision of such assistance to other local authorities.

The principal question is how many and which of the poor-law medical services can be absorbed into the public health organisation of the area, and how many must remain *ad hoc*. Each individual area must aim, not at providing every service everywhere, but at supplying as effective and complete a service as is practicable. The Report advises local authorities and their medical officers to consider the medical functions of boards of guardians on the one hand and those of county and county borough councils on the other hand, and to devise an organisation most likely to prove effective for the joint performance of these functions in the varying circumstances. It offers a most valuable guide in a complete review of the medical functions of both bodies, and mentions the principal matters which will require the prompt attention of medical officers of health. Perhaps the most essential thing to secure is effective coördination, not only between the various branches of the service and the various institutions carrying out related duties, but also between local authorities and voluntary agencies and between institutional medical treatment and environmental hygiene and sanitation. The services which must now be woven into a unified organisation on behalf of the whole community include water-supply, drainage, refuse collection, housing, smoke abatement; the control of the food- and milk-supply; health in the office and factory; maternity, infant and child welfare; school medical service; isolation hospitals and treatment of fevers; baths and wash-houses; cleansing of persons, and the direct treatment of such diseases as tuberculosis and venereal and mental disorders. "For the first time in the history of the public health service the medical officer of health has a direct and ample opportunity for closely and effectually coördinating in his area all the varied medical services of the State."

Epidemics during 1928.

The outstanding events of the year in general epidemiology were the continued prevalence of small-pox (to which we referred in an earlier issue[2]), an unusually large incidence of scarlet fever, and a widespread epidemic of influenza in the winter of 1928–29. The diphtheria figures are also greater than during the preceding quinquennium, and the mortality was 5·2 per cent. Seventeen borough councils in London, but only 19 local authorities in other parts, are now providing immunisation against diphtheria. The personal influence of the health visitor, supported by a simple pamphlet, usually provides a steady flow of applicants at the clinic. Toxoid-antitoxin mixture is generally used, but a preparation of toxoid alone is equally safe and is said to be equally effective. The experience of the year has strengthened belief in the value of the method, but has shown that better results are obtained if an interval of two or three weeks is allowed between each injection.

Scarlet fever continues to be mild, with a case mortality of 0·56 per cent. More use is being made of antitoxin, which reduces the tendency to complications, but the progress of active immunisation with toxin is limited by the number of doses required.

Measles ranks second only to whooping-cough as the most fatal infectious disease of childhood. During 1928 it accounted for 4302 deaths. The serum of convalescent patients has been found a very useful prophylactic, although not of much use in treatment.

The deaths from whooping-cough show a decline from 3681 in 1927 to 2976 in 1928.

A study of the outbreaks of enteric and the paratyphoid fevers show that gross sanitary defects are becoming less and less responsible, while special danger lurks in the modern methods of wholesale distribution of foodstuffs, which make it difficult to track down the originator and distributing agents. During July and August nearly 400 persons in London were attacked by paratyphoid B; it was found impossible to trace the infection beyond a wholesale cream dealer who received cream from three different sources, two of them outside the country.

There was a decrease in prevalence of infectious diseases of the nervous system, especially of acute poliomyelitis and, to a lesser extent of encephalitis lethargica. The encephalitis unit at Winchmore Hill is to be extended, and progress has been made with the arrangements for dealing at the Rampton State Institution with cases certified under the Mental Deficiency Acts.

[1] On the State of the Public Health. H.M. Stationery Office. Pp. 295. 3*s*.

[2] THE LANCET, August 31st, p. 480.

There was no plague in 1928, although plague-infected rats were found on board several ships which reached this country, and the anticipated drift of cholera westward did not materialise. There were three cases of typhus, two of them in Stepney being confirmed by the Weil-Felix reaction. The 683 cases of dysentery notified during the year represents a considerable increase; 58 per cent. of the cases occurred in mental hospitals.

Influenza.

Since the third pandemic wave in March, 1919, there have been several trailers: in January, 1920; in April and May, 1923; and early in 1924. In January, 1925, the whole country was affected. There was only a slight recrudescence in 1926, but in 1927 there was an epidemic of the second order of importance. The year 1928 passed without any influenza, but the news from America caused disquieting anticipations which were fulfilled by a serious epidemic from January to March, 1929. The death-rate per 1000 rose from 0·16 for the great towns in the first week of December to 5·78 in the last week of February. There seem to have been two main waves, the first proceeding southward from Glasgow while the other extended northwards from greater London. None of the signs recognised by epidemiologists as precursors of an influenza epidemic was noticed in this country in the autumn of 1928, and it seems probable that the infection was introduced directly from America and fostered by the exceptionally cold weather in January and February. The public schools suffered considerably in this epidemic, but the disease was mild. Otitis media, however, was a rather common complication. The report discusses the symptoms of influenza and the variations shown in the different epidemics. That of 1928 was characterised by a four days' fever with some pulmonary catarrh and two kinds of onset: sudden, with acute hyperpyrexia, followed generally by rapid convalescence, or insidious, with early subnormal temperature, headache, and malaise, followed by a protracted convalescence. The respiratory system was frequently involved and acute sinusitis was common. The symptomatology, however, varied in different parts of the country. The Report draws attention to the possibility that a rash may be associated with influenza, and outlines the principles of treatment and prevention.

Tuberculosis.

During 1928 a total of 77,881 new cases of tuberculosis were notified, and it is generally agreed that notification is steadily becoming more effective. Nevertheless, 4252 of these new cases were only notified after death, so that there is still room for improvement. The number of deaths from all forms of tuberculosis was 36,623, a decrease on the previous year. Since 1911 the gross death-rate from pulmonary tuberculosis in men has fallen from 1233 to 879 per million, while the reduction in non-pulmonary tuberculosis is from 436 to 188. These encouraging figures show that the measures taken to combat the disease are well worth continuing. The Report discusses the present accommodation for tuberculous patients, the possible modifications under the new Act, and the notification returns. The new Act should greatly assist local authorities in the important task of formulating wise schemes for after-care and technical education. Investigations have been and are still being made into immunisation of the newly-born by Prof. Calmette's method. The results of the special inquiry into tuberculosis among printers have now been published; the report does not explain the high incidence of this disease among printers, but brings out certain differences between the occupational groups which will pave the way for further inquiry.

Cancer and Radium Treatment.

Cancer continues to exact its heavy toll, the death-rate in 1928 per million population being 1425, an increase of 50 on the previous year. Sir George Newman discusses the problems which are brought out by the statistics relating to cancer incidence and reviews the special inquiries which have been made by the Departmental Committee. Especial attention is given to the possibilities of treatment by radium and the effects and modes of application of radio-therapy. The conclusion reached is that radium alone, properly applied, will bring about the disappearance of a primary cancer, in a fair proportion of cases, from the skin, the cervix uteri, and the mouth and tongue. There is not as yet sufficient experience available to claim an equal success against cancer in other parts of the body, and secondary cancer in glands requires supplementary X ray treatment in every case. The Report reviews the organisation of radium therapy in the various European countries and lays down certain guiding principles for its development in England. These are:

1. If this rare element is to be used as economically as possible it should be kept constantly in action, so that as many patients as possible receive treatment.
2. The radium must be maintained in different quantities in containers of various sizes and shapes for use in different regions.
3. The supply of patients at suitable centres must be adequate to keep the radium in continuous use; sending radium to patients causes loss of radio-active time and is likely to lead to inefficient treatment.
4. The services of regional surgical and radiological specialists must be available.
5. Attendants must be fully trained in the use of radium, both from the point of view of skilled service and from that of their own safety.
6. Radium can be used safely and wisely only by thoroughly competent experts.
7. The radiotherapist and the surgeon must coöperate from the very beginning of treatment.

The conclusion is the same as that of the Radiological Subcommission of the League of Nations[2] that radium therapy can only be adequately developed by means of specialised centres serving large populations, and that research and treatment must proceed hand in hand.

Venereal Disease.

At the end of 1928 there were 188 treatment centres for venereal disease in England and Wales, employing 386 medical officers and with an average of 787 sessions weekly. There was a decrease of 2·7 per cent. in the new cases of syphilis, an increase of 9·9 per cent. in gonorrhœa, and an increase of 10·2 per cent. in patients who attended the centre but were found to be free of venereal disease. The London County Council initiated during the year a scheme for continued observation of girls discharged from hostels. Through the Central Council for the Social Welfare of Girls and Women in London, a certain number of rescue homes have agreed to take in girls who have been under treatment for venereal disease but have become fit to mix with others. This will provide continued treatment and observation for these girls while at the same time enabling the existing hostels to find room for a greater number of acute cases. Experience continues to show that the most important factors in the success of a treatment centre are the personality of the staff and the convenience of the premises. There is a definite improvement in the promptitude with which patients seek treatment, and this is attributed to the steady educational work carried out by local authorities and the British Social Hygiene Council. Expenditure on propaganda is economically justified, for the cost of treatment of a patient whose serum reactions have become positive is at least £2 more than that of a primary case in which the reactions are still negative. Reviewing veneral disease schemes in other countries the Report points out that the British scheme has the advantage of central supervision and universal free treatment.

Food.

An ever-increasing interest is being taken in dietetic questions, and the value of milk for growing children is becoming generally recognised. More than one

[2] THE LANCET, August 17th, p. 348.

dairy organisation has inaugurated a scheme for paying farmers a bonus on the bacteriological cleanliness of their milk. The suggestion that "if the public will drink more milk they will get a better, cleaner, and cheaper supply" is characterised as putting the cart before the horse. Not until a better, cleaner, and cheaper supply is provided can increased consumption be expected. There seems no doubt that the cooling of milk at depôts and its despatch in bulk in suitable tanks is a great improvement, both economically and hygienically. Its only disadvantage is the difficulty which it imposes when any district wishes to trace an infected sample to its origin. The solution seems to lie in the development of a more active control by the authorities of the producing areas. The number of producers and distributors who obtain licences for Certified and Grade A milk is steadily increasing. Of the 12,000 milch cows in licensed herds in 1928, some 4800 were in Certified herds and 7200 in Grade A tuberculin-tested herds. The intradermal tuberculin test has been found the easiest and most reliable under ordinary farm conditions. A large number of samples were taken for bacteriological examination, and most of them were satisfactory. As the Report remarks, the indirect effect of grading is of paramount importance, for it has stimulated the whole industry to produce better milk.

Imported meat proved satisfactory during the year, except for some consignments of tuberculous meat from the Irish Free State, and a rather large incidence of caseous lymphadenitis in mutton imported from South America and Australia. The new Food and Drugs (Adulteration) Act came into force on Jan. 1st, 1929, and will simplify the work of those concerned in its administration. Of 129,034 samples of food analysed during the year, 7524 were found adulterated or below standard, and 757 contravened the Preservative Regulations. Nearly half these were sausages or other meat products. The Artificial Cream Act, which came into operation on June 1st, 1929, attempts to regulate the "reconstituted cream," which is prepared by emulsifying butter, dried skim milk and water, and which, if carefully blended, cannot be distinguished from natural cream by the analyst. There were no striking outbreaks of food poisoning during the year, but the Report discusses a number of cases where it was not possible to prove the source of the infection.

Hygiene and International Health.

The Intelligence Section has continued its collection, tabulation, and indexing of medical information from home and foreign sources, and a number of important reports and memoranda were issued during the year. The working arrangement between the Ministry, the Medical Research Council, and the London School of Hygiene and Tropical Medicine has proved satisfactory. During 1928 a great deal of important statistical work was carried out, including investigations into anthropometric data, pre- and neonatal mortality, cancer, certified incapacity, and experimental and clinical epidemiology. The Ministry's pathological laboratory has been paying special attention to the immunological classification of streptococci[3] and a revision of the serological types of the Flexner group.

Rheumatism and Undulant Fever.

The value of the notification of rheumatism remains doubtful. The number of rheumatism supervisory centres is increasing, and the number of beds for the treatment of rheumatic affections under the Metropolitan Asylums Board has increased to 520, in addition to the special unit for 60 acute cases at Carshalton.

Recent investigation has shown that cases of undulant fever occur in European countries where the disease had not been suspected, and the Ministry therefore investigated the possibility of its occurrence in this country. Although it does not appear that there is any endemic undulant fever in England, it is unwise to assume that there never will be, and medical practitioners and bacteriologists are asked to bear the possibility in mind.

Miscellaneous.

Among other inquiries carried out by the Ministry in 1928 was one into the existing provision for sick public-school boys and the principles which should underlie sanatorium accommodation. Another inquiry was made into the supervision which is exercised by local authorities over working conditions in offices. Liverpool seemed to be the only town where offices not associated with workshops undergo any routine inspection. Cubic space, ventilation, lighting, and sanitary accommodation are points of great hygienic importance for office workers, but it must be admitted that detailed systematic inspection of all offices would be extremely onerous, and in the opinion of the Ministry it is doubtful whether the results would justify the time and expense involved. An office committee has considered the hygiene of swimming baths and has laid down certain principles for its maintenance. The Reports on rural water-supplies and artificial light treatment have already been noticed in our columns.[4] The unhappy condition of the coalfields in 1928 led to an inquiry into the conditions of the inhabitants of certain mining areas. The results on the whole were reassuring, apart from an increase in rickets in certain areas of South Wales and a lack of vitality among women, especially expectant and nursing mothers.

[3] THE LANCET, 1928, ii., 697.

THE INTERNATIONAL CONGRESS OF OPHTHALMOLOGY.

MEETING IN HOLLAND.

THE Thirteenth International Congress of Ophthalmology—the first meeting of this nature to take place since the war—was held from Sept. 5th to 13th in Holland. Under the presidency of Prof. J. VAN DER HOEVE the Congress was officially opened by the Queen Mother in Amsterdam, while the concluding sessions were held in the seaside resort of Scheveningen. The meeting was a very large one—larger than any previously held—and the members included the great majority of the leading ophthalmic surgeons from every country in the world; the social arrangements were efficiently and delightfully organised and bore testimony to the boundless hospitality of the Dutch, not the least pleasing aspect being the personal interest shown by the Royal House; and the scientific proceedings throughout were of sustained interest and high standard.

Glaucoma.

The first question for discussion was the Ætiology and Non-operative Treatment of Glaucoma, upon which a symposium was held. It was opened by Duke-Elder (London) who introduced the subject from the physiological point of view. He suggested that in glaucoma the raised tension, although the most obvious symptom, was not the basically essential factor, but was one of the more striking manifestations of a general derangement of the intimate metabolism of the eye. He discussed the economy of the eye in so far as it affected glaucoma under three headings: the equilibrium between the capillary blood plasma and the intraocular fluids; that between the intraocular fluids and the vitreous body; and that between the blood in the choriocapillaris and the retina. He concluded that in the majority of cases glaucoma was ultimately due to an upset of these equilibria determined by changes in the capillaries and changes of a physico-chemical nature in the vitreous body, while the onset of pressure was largely conditioned by a failure in the facilities for drainage at the canal of Schlemm. Hagen (Oslo) followed with a paper wherein he stressed the importance of diurnal

[4] THE LANCET, 1928, ii., 1070; 1929, i., 884.

variations in pressure; in simple glaucoma the curve generally shows nightly heights, in secondary glaucoma it shows nightly falls. He suggested that the rationale of the first change depended upon obstructed drainage, that of the second on a disturbance in the production of the aqueous humour. Magitot (Paris) started from the principle that glaucoma is essentially an œdema of the eye, the ætiology of which should be associated with the general pathological considerations which produce œdema elsewhere. The chief factor is a derangement of the permeability of the capillary walls, a state determined by disease of the vessels or irritability of the nervous system; general treatment devoted to the whole body is therefore of the first importance. Wessely (Munich) laid stress upon the fact that no theory of glaucoma had yet arrived at the stage when its application could be put to the test of practice, and suggested that it was premature and dangerous to be led away by preconceived theoretical considerations to the subordination of the well-tried local methods of therapy by miotics and operation. He discussed the newer methods of therapy which had been advocated, such as the use of adrenalin, and stressed the danger of allowing the right moment for successful operative intervention to pass through placing unjustifiable reliance upon them. These four opening papers were followed by a prolonged discussion: Passow (Munich) stressed the ætiological importance of the ductless glands, especially an increased function of the thyroid; Fracassi (Arezzo) spoke of the importance of a disturbance of the capillaries either of anatomical or functional nature; Friedenwald (Baltimore) gave a very interesting account of his pathological investigation into the state of the capillaries in acute glaucoma, and described experiments relating these changes to the action of histamine. Hamburger (Berlin) suggested that since glaucoma means a rise of pressure and cyclitis is associated with a fall, the rational treatment of the first disease would be the artificial production of the second. Bonnefon (Bordeaux) discussed the hypotensive action of a retrobulbar injection of adrenalin; in some cases this is due to vasoconstriction, in others to the mechanical pressure effect of the injection. Other papers on glaucoma included a contribution by Sallmann (Vienna) on diurnal pressure curves; by Bistis (Athens) on the influence of the sympathetic nervous system; by Waardenburg (Arnhem) on its association with nævi; by Kerry (Montreal) on the effects of congestion of the ciliary body on the drainage channels of the eye; by Troncoso (New York) on the gonioscope in the diagnosis of glaucoma; by Comberg (Berlin) on the international standardisation of tonometry; by Péretz (Cairo) on the association of glaucoma and cataract; by Jasinski (Poznan) on the osmotic pressure of the blood in glaucoma; by Mawas (Paris) on the hydrogen-ion concentration and the alkali reserve of the aqueous humour; and several contributions to the operative treatment of the disease—those of Tulières (Bordeaux) on sclerectomy; Velter and Duverger (Paris) on the sclerecto-iridectomy of Lagrange; Preziosi (Malta) on the effects of electro-cautery puncture; Meyenhof (Cairo) on sclero-iridotomy; Szymanski (Wilno) on a modification of Elliot's operation; and Fiore (Rome) on a new procedure wherein a sclero-ciliarotomy is made by cautery incision.

Trachoma.

The second subject chosen for a symposium was the Geographical Distribution and the International Social Campaign Against Trachoma. This attracted a very large number of speakers drawn from all over the world, and, each contributing in statistical form the incidence of trachoma in his own country and the measures which were taken to combat it, an unprecedented review was accumulated which should prove of no small value. Over 25 papers were contributed, but their value can only be appreciated on detailed study; the most impressive result which emerged was the extraordinarily wide geographical distribution of the disease and the immense social and economic disadvantage it brings in its train. In England the incidence of trachoma is low, but in such countries as the Sudan, Palestine, Cochin China, the Argentine, Formosa, and others it is met with in 20 to 30 per cent. of the entire population. The extent of this universal scourge is now generally recognised and measures adopted against it include the control of the frontiers, compulsory notification, examination and treatment of school-children and recruits. It is to be hoped that the result of the wide publicity given to the question in this Congress, and the gathering together of information and the exchange of ideas will lead to a still more intensive world-wide campaign which can do nothing but good.

Suprasellar Tumours.

A third symposium of more than usual interest on the Diagnosis of Suprasellar Tumours was introduced by Christiansen (Copenhagen), Cushing (Boston), Gordon Holmes (London), and Van Bogaert (Antwerp). Christiansen outlined the general symptomatology of these tumours and explained the rationale of the various clinical manifestations, illustrating his remarks by the description of cases. He laid stress on the diminution of the visual acuity, which was usually unilateral and frequently temporal; colour vision alone may be first affected, and a central scotoma was frequent. Cushing omitted from his remarks the more obvious tumours affecting the chiasmal region which were readily recognised by X rays, and confined himself to the simple chiasmal syndrome of optic atrophy and bitemporal field defects produced, in the practical absence of other symptoms, by suprasellar tumours occurring with an approximately normal sella turcica. He discussed the various pathological entities which may be responsible for the condition (adenomata, tumours of Rathke's duct, chiasmal gliomata, meningiomata, &c.), and stressed the importance of distinguishing their early symptoms from toxic amblyopias and retrobulbar inflammatory conditions. Gordon Holmes dealt in detail with the symptomatology of tumours of this region and emphasised several points in their differential diagnosis; he also discussed the clinically related conditions of basal aneurysms which involved the optic pathways, and chronic basal arachnoiditis and the formation of meningeal cysts in the region round the chiasma. Van Bogaert drew a pathological distinction between tumours associated with Rathke's pouch and the other neoplasms in the chiasmal region. He discussed the local symptomatology, and emphasised the systemic derangements which are also met with: somnolence, polyuria, vasomotor, respiratory, and pigmentary disturbances, an upset of the basal metabolism with derangements of carbohydrate, fat, and chloride metabolism, and also psychic effects. He pointed out that these patients usually first applied to the oculist with whom rests the responsibility of diagnosis and the possibility of early treatment. These opening speakers were followed by papers by Brouwer (Amsterdam), who discussed the difference in the visual fields in intra- and suprasellar tumours; by Hirschmann (Berlin) on the diagnostic and therapeutic value of transfrontal pituitary puncture; by Rollet (Lyons) on the clinical forms and complications of suprasellar tumours; by Igersheimer (Frankfurt), Hirsch (Vienna), and others.

Other Subjects.

In addition to these special subjects chosen for symposia a great volume of individual papers was presented, numbering over 250 and ranging over every branch of ophthalmology. The more interesting contributions of a scientific nature included an exposition of the rôle of the rods in the retina in dyscritic vision by Sir John Parsons, who seconded his argument by phylogenetic and recent experimental studies; a paper on the vessels of the iris in reptiles and birds by Mann (London); on the finer structure of the retina with special reference to the corpuscles recently described by Fortin, by Enriquez (Madrid); papers on the lens, with special reference

to the iso-electric points of its proteins by Scalinci (Naples), and its mineral constituents by Burdon Copper and Lewis (Bath); and on lens' antigen by Davis (Wisconsin). Interesting cases included one described by Paton and Williamson-Noble (London) of Lindau's disease; the case had come to histological examination and this suggested that the primary lesion is a capillary angioma and that the gliosis is secondary. A somewhat similar case associated with a glioma of the spinal cord was described by Jess (Giessen). Oguchi's disease of the retina and the syndromes associated with congenital hemeralopia was discussed by Oguchi (Nagoya). Cyanosis of the retina in association with vascular disease and polycythæmia was discussed by Moreno (Madrid); arachnodactyly by Ormond (London); retinal melanoepithelioma by Paschoff (Sofia); and many more. Several speakers strongly advocated the treatment of detached retina by ignipuncture, the cautery being inserted through the hole in the retina (if that were present)—Bufill (Barcelona), Gonin (Lausanne), Arruga (Barcelona), and others. The problems of refraction and the prescribing of spectacles, of muscular anomalies and heterophoria, attracted a great deal of attention, and newer methods of operative technique and of treatment, such as by diathermy, provided material for discussion.

Not the least interesting contribution was the demonstration of apparatus and special methods: the gonioscope of Troncoso (New York), the nystagmograph of Ohm (Bottrop), the phoro-optometer stereoscope of Wells (Boston), the ergograph of Berens (New York), the adaptometer of Hertel (Leipzig), the red-free ophthalmoscope of Lauber (Vienna), and others; while a novel and interesting sideline was the demonstration of several films showing ophthalmic operations, particularly by Wessely (Munich) and Elschnig (Prag).

UNITED STATES OF AMERICA.

(FROM AN OCCASIONAL CORRESPONDENT.)

Prohibition.

THE event at the recent meeting of the American Medical Association which has given rise to most publicity is one in itself of no particualr importance. Dr. Thayer, the retiring president, let fall some remarks disparaging the present tendency of government to control our personal behaviour. This proved an active stimulus to the chairman of the Methodist Church Board of Temperance, Prohibition, and Public Morals, Rev. Clarence True Wilson, who thereupon launched a violent attack on Dr. Thayer, asserting that he had been unfairly elected to his high office by "wet" influence. This attack was noticed by the House of Delegates, who adopted unanimously a report which stated: "The committee expressly commends and endorses the sentiments expressed by Doctor Thayer concerning legislative enactments that are inimical to the best interests of the medical profession and public by restricting medical men as to what shall, and what shall not, be prescribed for the relief of human ills." Several of the State medical journals, and not least those from the "dry" states, have printed editorials condemning the outburst of this "dry" leader, and extolling the action of the House of Delegates.

Meanwhile, an "open forum" on the subject of prohibition if being conducted by the *Medical Journal and Record*. Letters are printed from doctors in various distant parts of the country, apparently in response to a questionaire. The pros and cons are fairly evenly divided, and the arguments used for the most part, cancel out. Thus the superintendent of a State hospital in Ohio notices "a marked decrease in alcoholic psychoses." The superintendent of a hospital in Michigan is equally positive that the alcoholic psychoses have increased. On this particular point some independent statistical evidence was published last month by H. M. Pollock and F. W. Brown in *Mental Hygiene* (1929, xiii., 591). It appears from their investigations that alcoholic psychoses in 15 States have increased per 100,000 of general population during the years 1921, 1922, 1925, and 1926. The latter rate, however, is slightly less than the corresponding rate for 1919. Data concerning the proportion of intemperate users of alcohol among new admissions were received from 65 hospitals in the 15 States, and show a steady increase in these intemperate users, which is, however, proportionate to the increase in population. The interpretation of all these observations is open to question, since no one can tell what would have happened to the rates if prohibition had not been in force. Whether alcoholism has decreased or not in this country it seems rather obvious that it has not decreased here as rapidly as it has in Great Britain.

Medical Literature and the Mails.

It has been generally assumed that information on contraception cannot be legally put in the mails. Quite recently an article containing such information was offered to the editor of a State medical journal. The article was printed, but only after all the specific instructions as to method had been expurgated. Dr. Dickinson, the energetic secretary of the committee on Maternal Health, now points out that the same law which bans information on contraceptive methods also bans information on the technique of abortion: "every book . . . giving information directly or indirectly . . . by what means . . . any act or operation . . . of any kind . . . for the . . . producing of abortion . . . or how abortion may be performed . . . is declared nonmailable matter." A good many standard text-books must come under this ban. However, it is doubtful whether the law will be enforced against either publisher or recipient in the present state of public opinion. Reports containing details of contraceptive methods, as well as medical journals describing them, have actually been sent through the mails without prosecution having ensued. On the other hand there is no security, and the recipient, as well as the sender, of such literature is liable to a fine of not more than $5000, or imprisonment for not more than five years, or both. The customs authorities rigidly exclude contraceptive apparatus from the country, even when it is addressed to leading hospitals. This has no pronounced effect, since the apparatus is manufactured by several concerns and sold freely at quite reasonable cost within the United States. There are, of course, other means of transportation besides the Federal postal service.

The Prevalence of Venereal Disease.

Recent statistics indicate that the venereal diseases are still widespread in the United States. Among 100,000 male prisoners undergoing routine examination in California a history of venereal sore was obtained from 15 per cent., and in 9·2 per cent. the blood gave a positive Wassermann reaction. Nearly 50 per cent. gave a history of gonorrhœa that could not well be mistaken. Last year in the State of Illinois there were reported 19,826 cases of gonorrhœa and 12,699 cases of syphilis. Among all other diseases pneumonia took first place with 19,139 cases; followed by chicken-pox, 13,681; scarlet fever, 12,355; and tuberculosis, 12,155. Public health authorities tend to rely increasingly on education to prevent the spread of venereal infection. It is reported that some sex instruction is now given in more than 25 per cent. of the high schools of this country, as compared with similar instruction in not more than 10 per cent. of the schools ten years ago.

Tariff Revision.

There has been a good deal of protest against the general upward revision of the Tariff by the House of Representatives in this country, as well as abroad. The proposed increases in the duty on medical and dental instruments (from 45 and 35 to 70 and 60 per cent. ad valorem respectively) caused as much protest

as any proposal, and the finance committee of the Senate has tentatively agreed to recommend against the increase. The committee has approved, however, increases in the rates on other instruments and utensils used in hospitals and medical laboratories, and it is to be feared that, unless energetic opposition develops in the Senate itself, a definite increase in the cost of such necessary articles as ophthalmoscopes and hæmocytometers is likely to result from the legislation of the present Congress.

IRELAND.

(FROM OUR OWN CORRESPONDENT.)

Control of Milk and Meat.

IT is stated that early in the next session of the Dail the Government of the Irish Free State will introduce legislation to control the milk and meat trades in the interests of health. It is believed that in regard to milk two grades will be officially recognised—namely, Grade A (tuberculin tested), and Grade A. For Grade A (tuberculin tested) the milk must be produced from cows which have passed a tuberculin test and have been submitted to veterinary examination. The whole herd must be tested, and every animal to be added to it must be tested before admission to the herd. A veterinary examination is to be made every six months. The milk must not have a bacterial count of more than 100,000 organisms per c.cm., or any coliform organisms in one-tenth c.cm., and must be bottled before distribution. Milk in this grade will be controlled and tested by the Department of Local Government and Public Health. Milk of Grade A must also be bottled before distribution. The herd from which it comes must be submitted to a veterinary examination every three months. The bacterial count must not exceed 200,000 organisms per c.cm., and the milk must not contain any coliform organisms in one-hundredth c.cm. Milk in this grade will be controlled and certified by the local authority. The sale of pasteurised milk will be permitted only in accordance with defined conditions, and the use of misleading terms will be prohibited. Power will be given to a medical officer of health to stop the sale of milk if there is epidemiological evidence that it is the vehicle of infective disease.

The problem of the control of the meat trade is different. Legislation will deal rather with the safeguarding of meat intended for export than with the prevention of disease at home, although, no doubt, both objects are in view. The export trade in fresh meat of all kinds—beef, mutton, pork—has increased nearly fortyfold in the past few years, and the Government is anxious lest this development should be checked by any carelessness about the condition of the meat. Legislation will prohibit the slaughter of animals for export in other than registered slaughter-houses, which must have been inspected to the satisfaction of the Minister before registration. Every slaughter-house will be under the supervision of a veterinary surgeon who will examine all animals before and after slaughter, and he will examine not only the carcasses but the offal. Provision will be made to control methods of transport by road, rail, and sea. The Bill will also deal with the conditions of packing and export of rabbits and poultry.

Conditions of Nursing Service in Cavan.

A recent inspection of the Cavan County Hospital by Dr. Boyd Barrett, one of the inspectors of the Department of Local Government and Public Health, has brought to light the highly unsatisfactory conditions under which the nurses in that institution are expected to work. For a considerable time past there has been discontent among the nursing staff, and many nurses have left after brief periods of service. In his inspection Dr. Barrett found four nurses sharing one bedroom. Another room was given to two nurses, one of whom was on night duty. It was therefore impossible for the nurse on duty to enter the room without disturbing the night nurse. Dr. Barrett found that the time off duty was only two hours a day, which period appeared to have included the dinner-hour. No half-days were allowed, and a whole day was only granted occasionally if work was slack, or to a night nurse after a month's night duty. In this hospital the worst features of the "living-in system," now no longer tolerated by shop-workers, still persist. It is to be hoped that the Department will exercise a careful supervision over the conditions of service of nurses in all institutions under its control.

Recent Appointments in Dublin.

Dr. W. E. J. Jessop has been appointed professor of physiology, physics, and chemistry in the School of the Royal College of Surgeons in Ireland. He has shown exceptional ability as a student in Dublin University, where he is at present assistant to the professor of bacteriology, and has been engaged in research work in chemistry and biochemistry.

Dr. A. G. Thompson has been appointed Rockefeller Foundation Fellow in Biochemistry in Dublin University under the scheme established last year by the Rockefeller Foundation. After a distinguished career in Trinity College, Dr. Thompson last year was appointed director of the pathological laboratory, Jervis-street Hospital.

Public Health Services.

A FATAL CASE OF POST-VACCINAL ENCEPHALITIS.

THE Bridgwater coroner held an inquest on August 27th on a girl of 13, who was vaccinated on August 10th, together with nine other children, all inmates of the Cottage Home at Cannington. Government lymph was used, and four insertions were made. She had not been previously vaccinated, and was in good health. The vaccination ran a normal course, the pustules being well-marked at all four insertions, and the surrounding inflammation quite moderate. On August 21st the girl complained of headache; on the following day she was drowsy, and the temperature rose to 103°F. On August 23rd, on removal to the Isolation Hospital, her temperature was 104°; she was then semi-comatose, with signs of encephalitis. She died at 4.15 P.M. next day without having recovered consciousness. Dr. G. W. Harvey Bird, medical officer of health for Bridgwater, tells us that the post-mortem examination, carried out the same night, revealed no sign of disease in chest or abdomen. There was no meningitis, but the entire brain was congested. None of the other nine children vaccinated developed untoward symptoms. Dr. Bird remarks that the incubation period of 11 days is apparently typical of post-vaccinal encephalitis.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED SEPT. 7TH, 1929.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 150 (last week 131); scarlet fever, 1964; diphtheria, 884; enteric fever, 107; pneumonia, 538; puerperal fever, 56; puerperal pyrexia, 94; cerebro-spinal-fever, 8; acute poliomyelitis, 21; acute polio-encephalitis, 6; encephalitis lethargica, 20; dysentery, 9; ophthalmia neonatorum, 105. No case of cholera, plague, or typhus fever was notified during the week.

The number of case in the Infectious Hospitals of the Metropolitan Asylums Board on Sept. 10th–11th was as follows:—Small-pox, 156 under treatment, 14 under observation (last week 165 and 8 respectively); scarlet fever, 1337; diphtheria, 1456; enteric fever, 18; measles, 277; whooping-cough, 218; puerperal fever, 23 (plus 8 babies); encephalitis lethargica, 125; poliomyelitis, 2; "other diseases," 28. At

St. Margaret's Hospital there were 15 babies (plus 8 mothers) with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns, including London, there was no death from small-pox, 4 (2) from enteric fever, 15 (2) from measles, 5 (0) from scarlet fever, 25 (6) from whooping-cough, 14 (2) from diphtheria, 79 (15) from diarrhœa and enteritis under two years, and 15 (2) from influenza. The figures in parentheses are those for London itself.

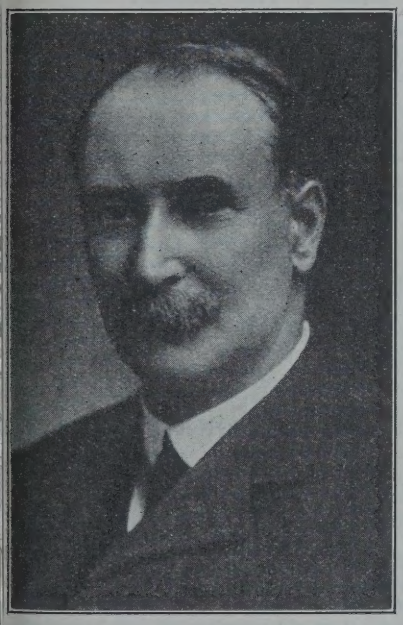
Of the deaths from diarrhœa (the number of which is practically stationary), 8 were reported from Liverpool, 7 from Birmingham, 5 from Gateshead, 4 from Sunderland, and 3 each from Leeds and Hull. Glasgow, Dublin, and Belfast reported 7, 6, and 4, respectively. Deaths from measles were reported from Liverpool and Sunderland, 3 each. Both fatal cases of enteric fever occurred at Birmingham.

The number of stillbirths notified during the week was 240 (corresponding to a rate of 37 per 1000 births), including 48 in London.

Obituary.

CHARLES ALEXANDER MORTON, O.B.E., F.R.C.S. ENG.

THE death of Mr. C. A. Morton which occurred, as briefly announced on Sept. 14th, during a holiday in Switzerland, ends a long and useful surgical career. Charles Alexander Morton was born in Bristol in 1860, his father John Morton himself being a surgeon, at one time on the staff of the East India Company in the Madras Presidency. He was educated at Clifton and went on to St. Bartholomew's Hospital for his clinical work, when he took prizes at every stage of his course, ending with the coveted Brackenbury Medical Scholarship. After qualifying in 1881 he became house surgeon at the Stanley Hospital in Liverpool, returning in the next year to be house physician at St. Bart.'s. In the period that followed he continued to gain varied experience in resident appointments, including that of house surgeon at the Cumberland Infirmary, resident medical officer at the Manchester Children's Hospital, clinical assistant at Great Ormond-street, and resident clinical assistant at the Leicester Infirmary. At this time he frequently contributed to current medical literature, his interests covering such subjects as subacute anterior spinal paralysis, coal gas and carbolic acid poisoning, ruptured hydatid cyst of the liver, and intestinal obstruction. Returning to Clifton he took the F.R.C.S. Eng., and became in 1891 registrar to the Bristol General Hospital, and assistant surgeon two years later; for 27 years was on the surgical staff of the hospital, retiring as senior surgeon in 1920. For 25 years he was also surgeon to the Bristol Children's Hospital, and he had surgical charge at the Cossham Memorial Hospital. These appointments were a matter of course, for Morton was, with the exception of Greig Smith, the first man of the Bristol school to devote himself purely to surgery.



PROF. MORTON.

Morton's work as a surgical teacher began with his appointment as professor of surgery in University College, Bristol, in 1897, and he occupied the chair for 28 years until his resignation in 1925, when he was appointed emeritus. As a teacher of students he was acutely aware of the contradictory nature of many of the statements contained in the current text-books, and he put forward a scheme for the production of a standard text-book of surgery for use by examiners and examinees alike. The objection that such standardisation might stifle inquiry he met with arguments to the contrary that impressed if they did not convince his fellow-teachers. As a surgeon he spared no effort in diagnosis, and demonstrated to students in the wards with emphasis which omitted no pathological possibility from consideration. He prepared the patient's skin for an operation with a thoroughness that amounted almost to a fault, operated and closed the wound with great deliberation, relying on others to the minimum, and doing his own dressings with a ritual that was nearly as precise as that of his operations. Such a laborious and painstaking performance may sometimes have been tedious to fellow workers, but it led to results which compelled the respect of the surgical profession and the warm admiration of his dressers, and earned the deep gratitude of his patients. During the war his work at the Beaufort (Territorial) Hospital was specially responsible and onerous. His interest then centred round injuries of nerves and blood-vessels, but he remained all his life at heart a general surgeon in the widest sense, and his contributions to surgical literature cover a large field. Two of these, on cuneiform osteotomy of the tibia for genu valgum and on the end-results of the surgery of cancer of the breast, are typical of his sound style and reasoning.

A man of strong individuality Morton took some part in public life and on committees of various kinds he showed an independence of thought which led him along well-reasoned lines to many valid conclusions. The critical faculty so dominated him that it often led him to assume opposition, as if his fellows could never be on the side of wisdom and truth, but at no time in his career did anyone, whether in agreement or disagreement with him, question either his sincerity or his singleness of heart. After retiring from hospital work he served as a member of the board of guardians, and here again he was concerned with the wider issues of administration. In politics his careful and analytical mind led him to support a non-partisan policy. Always of a retiring disposition Morton was latterly rather a lonely figure in Bristol. He was never physically robust, and he was unable to keep up the cycling and walking that had always served him as sole recreation in his more strenuous years. But many scores of patients will thankfully remember the unstinted services in which his life was spent.

Charles Morton was unmarried. His elder brother, Mr. Stanford Morton, the ophthalmologist, who lived in Clifton after his retirement, predeceased him by two years.

ST. GEORGE'S HOSPITAL.—The annual report of the House Committee calls attention to the enormous increase in the cost of maintenance. Last year it was £83,945, which is more than double the expenditure in 1913; the adverse balance was £7616. It is stated that every economy consistent with the proper treatment of the patients has been continuously practised, but unless an additional income of at least £20,000 can be secured "the time cannot fail to arrive when it may become necessary to curtail the hospital's activities." In 1928 there were 5096 in-patients, who stayed on the average 22 days and cost £14 10*s.* each. There were 39,705 new out-patients who cost about 7*s.* each. Contributions by, or on behalf of, patients amounted to £18,564.

Correspondence.

"Audi alteram partem."

THE "GRADING" OF BREAST CARCINOMATA.

To the Editor of THE LANCET.

SIR,—No one appreciates more than I the admirable work which Mr. D. H. Patey and Dr. R. W. Scarff have undertaken to divide carcinomata of the breast into different grades of malignancy. Their task is difficult and none would be justified in disparaging their careful methods of observation. At the moment all I wish to point out is that the primary tumour in carcinoma of the breast is the epithelial neoplasia that exists within the normal boundaries of ducts and acini and from which the invading cells originated. All epithelial cells that have transgressed those boundaries and are multiplying in outside tissues have an equal claim to be regarded as "secondary deposits," whether or no they have reached lymphatic glands. From this point of view—and it appears to me to be the correct one—the lump that forms the compact mass in the breast and which is generally spoken of as being the "primary tumour" is composed of "secondary deposits" and the primary tumour situated in the ducts and acini. When suitable methods are adopted the initial primary tumour—viz., the epithelial neoplasia—in the ducts and acini can be detected in all examples of early carcinoma of the breast without exception. In the later stages the detection is not so easy and in many instances the primary lesions are obliterated by the welter of secondary epithelial cell invasion. In attempting to grade the degree of malignancy in carcinoma of the breast the morphological and biological characteristics of the epithelial neoplasia within ducts and acini forms the most instructive and accurate standard on which to base comparisons between it and all its epithelial descendants.—I am, Sir, yours faithfully,

G. LENTHAL CHEATLE.

Harley-street, W., Sept. 12th, 1929.

THE "ASUERO" TREATMENT

To the Editor of THE LANCET.

SIR,—In the spring of this year the reports in the lay press of cures of paralysis by the Asuero method of treatment led to inquiries from patients suffering from different forms of paralysis whether they ought to risk the adventure of foreign travel to obtain this treatment or whether it could be applied in this country. I have recently had an opportunity of meeting in Lisbon a Dr. Patacho, who had just returned from a course of instruction in San Sebastian under Dr. Asuero, who is an ear, nose, and throat surgeon at the Red Cross Hospital. The line of treatment associated with his name evidently consists in setting up a reflex action through the mucous membrane of the nose. With a blunt probe shaped in a peculiar manner he searches for a sensitive spot—usually found in the mucous membrane covering the inferior or middle turbinate bones. This spot is not a fixed one, and is detected by the fact that every slight touch on it is sufficient to cause lacrymation and dilatation of the pupils. When the spot has been found it is treated by another blunt instrument which has been previously warmed; only occasionally is this instrument made hot. Most of the reports of the treatment have come from Lisbon, and I was content to make that city the centre of my investigations. I came to the conclusion that the people of Portugal are a more impressionable people than we are, and that no blame could be attributed to Asuero or his trained assistants for the sensational accounts of the cures obtained, though these are grossly exaggerated.

The following list of diseases from one of Asuero's printed cards shows the varied conditions which he claims to have treated with benefit: glycosuria, varicose ulcers, rheumatism in all its manifestations, hæmorrhoids, menstrual conditions, all pains, headache, noises in the ear, vertigo, pyorrhœa, epilepsy. Dr. Patacho did not entirely agree with this list, and it is hardly necessary to emphasise the fact that Asuero makes no mention of paralysis. In anterior poliomyelitis Dr. Patacho had failed to produce any results. The treatment is always used in conjunction with other known medical measures.

Whether any of the types enumerated by Asuero are really benefited is uncertain, but meantime it may be a service to my colleagues to have further confirmation of what they already must have guessed. Patients and their friends may rest assured that miracles are not being performed, and no case of paralysis with destruction of nerve or muscle tissue need hope for cure by such a method. On the other hand, it may be that in functional cases a strong reflex stimulation will suddenly rearrange the disordered cycle of impulses and lead to a restoration of voluntary activity, but the patient may rely on his family physician to know whether he falls into that category. An electrical test will soon reveal the condition and, if nerve conduction is intact, results of a startling nature may often be obtained quite apart from Asuero treatment. I am, Sir, yours faithfully,

THOMAS MARLIN.

Park-crescent, W., Sept. 16th, 1929.

*** This account confirms the impression conveyed by the note on this treatment from Dr. A. G. Gray, of Madrid, published in THE LANCET of June 15th, p. 1284.—ED. L.

OCCUPATIONAL DISEASES OF HOP-PICKING.

To the Editor of THE LANCET.

SIR,—The paper by Dr. Beatrice M. Smithies in your issue of Sept. 7th (p. 494) is of great interest to any practitioner who, like myself, works in a hop-growing district. Every year one comes across the three conditions she describes so clearly. With regard to the third, "hop gout," I am inclined to think the terminology is misleading. All the cases I have met with have differed in no way from typical tenosynovitis. Naturally this is unilateral, as the movements of the two hands in hop-picking are different; one hand is used for holding and the other for picking. Occasionally true gout occurs among hop-driers, but this is a totally different condition from that described by Dr. Smithies, and arises from quite different causes.—I am, Sir, yours faithfully,

Ledbury, Sept. 12th, 1929. LESLIE B. C. TROTTER.

IS CHILDBIRTH EASY AMONG PRIMITIVE PEOPLES?

To the Editor of THE LANCET.

SIR,—In an annotation on the Infancy of Midwifery in THE LANCET of April 6th (p. 727) I read that "among primitive peoples childbearing is often so easy as hardly to disturb the mother's working life." I was, Sir, of that opinion until I came to this island of the South Pacific (lat. 7° south), where I am the first medical man to be stationed.

These people are certainly primitive. The practice of head-hunting ceased only six years ago, and many men still carry their axes or spears and shields. Within the last fortnight, and only a mile distant, for no very apparent reason, a man killed his wife and child and burnt the hut over them. Spirit-worship is prevalent and fear of evil spirits is deeply inbred in the lives of the people. The women support the family by work in the gardens and carry their heavy loads home at night usually two to four miles over rough and hilly ground. When his wife is near full term the husband builds a leaf hut in the bush. This is the nursing home where she must stay until 14 days after the birth of the child. She sits on a log,

her back supported by the knees of a woman sitting behind. Another woman presses on the fundus.

But childbearing under these conditions is by no means a minor event to the woman and not rarely the leaf hut witnesses the death of the mother or child or both. The last six consecutive cases admitted to this hospital support this view.

1. Second pregnancy. Last baby born dead. This time two and a half days' labour; pains increasing in strength and severity. Forceps. Puerperium: cystitis.
2. First labour difficult. Baby born dead. This labour: small pains 12 hours, severe 30 hours. Puerperium: obstinate cough.
3. Primipara. Labour 18 hours, strong pains. Puerperium: breast induration with fever.
4. Multipara. Labour 12 hours; strong pains.
5. Multipara. Last labour, uterus "came right outside." Vulva showed old tear of second degree. This labour: 15 hours, severe pains. Puerperium: severe perisplenitis of enlarged spleen (malaria).
6. Primipara. Small pains, increasing in severity. Waters broke after 48 hours. Severe pains for further 24 hours.

Further confirmation is supplied by the frequently heard statement "his mother died when he was born." I am not dealing with causes. I wish only to state that here, at least, amongst this primitive people with all its disease, dirt, and customs which go to make up the picture, labour is not a minor incident, and would seem to be no whit easier than in New Zealand or Dublin.

I am, Sir, yours faithfully,

CLIFFORD JAMES, M.B. (N.Z.), D.T.M. & H. (Lond.), F.R.C.S. Edin.

Methodist Mission Hospital, Choiseul, British Solomons, July 24th, 1929.

EFFECT OF X RAYS ON BLOOD-PLATELETS.

To the Editor of THE LANCET.

SIR,—We are certain that Dr. Cramer and Dr. Mottram need no assurance from us that we had no intention of misrepresenting their results, or of detracting in any way from the value of their work. The important points to us appear to be: (1) What are the changes produced by radiation on the blood-platelets? (2) What relation, if any, do they bear to the symptoms of radiation sickness? (3) Is the cat a suitable animal for blood-platelet studies?

Our experiments show that the decline in the platelet count in the cat is not associated with evidence of infection, and does not seem to run parallel with the deterioration in the clinical condition; in fact, signs of general improvement are visible before the platelets are at their lowest level, and the animal may appear outwardly quite normal long before full recovery of the platelets to their original level has taken place. Animals that succumbed with marked evidence of infection showed no significant change in the platelet count; in the experiments of Cramer, Drew and Mottram, the animals that died of infection also showed a thrombopenia. It was this difference between our results and theirs that we wished to draw attention to, especially in view of the fact that Dr. Cramer and his co-workers have in a number of communications laid stress on the frequent association of infective states with thrombopenia.

We incline to the view that the infective conditions which are so striking a feature following lethal doses of X radiation in the cat may be due to injury to the small intestine (of which we have ample evidence), coupled with the almost complete disappearance of the white cells from the blood. Dr. Cramer has reported changes in the intestine following gamma radiation, though they do not appear to be altogether of the same nature as those observed by ourselves following X radiation.

Dr. Cramer and Dr. Mottram further suggest that the cat may be an unsuitable animal for blood-platelet studies. We think that it is always advisable to work with an animal which is as high up the scale as possible, if one hopes to draw any conclusions which may be applicable to man. The statement in our paper that "the range of normal variation noted in the small series studied is from 0·75 million to over 5 millions," meant, of course, that this was the range noted in the series and not in any one individual. In fact, cats can be divided into two groups from this point of view: those with high and those with low platelet counts. Animals with high platelet counts continue to show this feature if regularly examined over a period of weeks, and such animals appear to us peculiarly suitable for radiation studies for this reason. The criticism frequently offered on platelet work in the past has been that the variations produced are not strikingly outside the range of error of the technique; we feel that this objection cannot be offered against results such as ours, in which the platelet decline was from the order of several millions to one of several hundred thousands per cubic millimetre.

We are, Sir, yours faithfully,

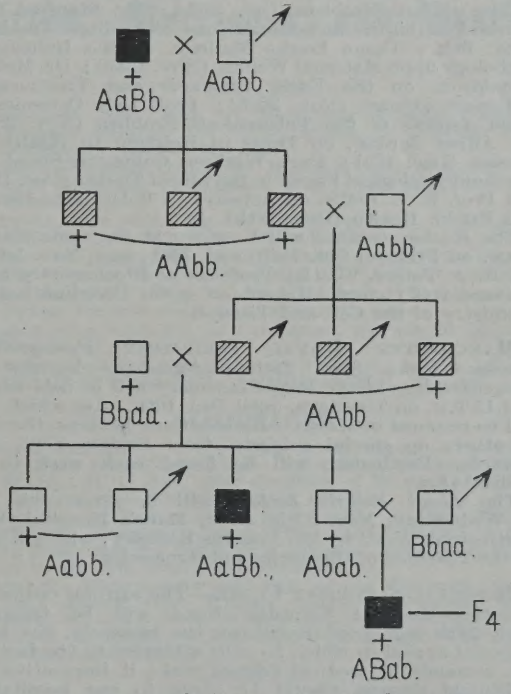
SAMSON WRIGHT.
H. A. BULMAN.

Cancer Research Laboratories, The Middlesex Hospital, W., Sept. 17th, 1929.

AN INHERITED TENDENCY TO SUPERNUMERARY DIGITS.

To the Editor of THE LANCET.

SIR,—"Phalanx's" letter in your issue of August 3rd (p. 256) affords some more data with regard to the complicated story of polydactylism. There exists a mass of apparently conflicting evidence in cats, guinea-pigs, and poultry. The matter is not at all clear yet and the following hypothesis, which accounts for the pedigree cited by "Phalanx," must not be considered to be necessarily correct. I suppose that



the supernumerary digits are the result of the interaction of two Mendelian factors (A) and (B); while when one factor (A) is present in the homozygous condition it produces the long thumbs, like index-fingers. In the accompanying chart I have set out the pedigree given by "Phalanx," the black signs representing persons with supernumerary digits and the shaded signs those with long thumbs. On this hypothesis it is seen that any of the F_4 children are liable to have supernumerary digits.

I am, Sir, yours faithfully,

HUMPHREY J. H. HARE, M.A.

Great Yarmouth, Sept. 3rd, 1929.

Medical News.

DEATH OF DR. R. T. SLINGER.—The death of Robert Townley Slinger, M.B. Manch., F.R.C.S. Eng., on Sept. 10th, at the early age of 49, is deeply regretted in Worcester, where he was in general practice for 20 years. An honours graduate of Owens College, he qualified in 1903, and began a series of appointments at the Manchester Children's Hospital and the Royal Infirmary. In 1906 he collaborated with Sir Victor Horsley in a paper on the Orientation of Points in Space by the Muscular, Arthrodial, and Tactile Senses of the Upper Limbs, and two years later he took the diploma of F.R.C.S. Dr. Slinger went to Worcester in 1909 as a partner of the late Dr. T. P. Gostling, and when the latter retired he undertook single-handed the work of a general practice which was continually expanding. His services were early sought for the Worcester Infirmary, and he became at first anæsthetist and then hon. surgeon. He gave of his best to his patients here in skill and in time. Despite the calls of a big practice, he always regarded the infirmary as his first duty. His surgical technique was of a high order, and he successfully undertook operations requiring much experience and judgment. His colleagues and patients in Worcester were about to present him with a testimonial in token of their regard, and to show their sympathy with him in his misfortune at having to give up practice owing to bad health. Unfortunately, the presentation never took place, owing to the rapidity of his last illness. The fund is still open for those who would show in a practical way their gratitude for kindnesses received. He leaves a widow.

ROYAL INSTITUTE OF PUBLIC HEALTH.—A course of lectures on Problems of Personal and Public Health will be given at this Institute, 37, Russell-square, London, W.C. on Wednesdays, at 4 P.M., from Oct. 16th. The lecturers will be Dr. Graham Little, on the Health and Conditions of Work of Medical Students (Oct. 16th); Mr. J. C. Stobart, on Broadcasting and Health (Oct. 23rd); Dr. A. F. Hurst, on the Asthma Problem (Oct. 30th); Mr. Stanford Cade, on the Possibilities and Limitations of Radium Treatment (Nov. 6th); Dame Louise McIlroy, on the Influence of Pathology upon Maternal Welfare (Nov. 13th); Dr. Malcolm Donaldson, on the Early Diagnosis and Treatment of Malignant Disease (Nov. 20th); Prof. Lyle Cummins, on Some Aspects of the Tuberculosis Problem (Nov. 27th); Dr. Alfred Jordan, on Dress in Relation to Health and Disease (Dec. 4th); Prof. Winifred Cullis, on Speed as a Psychophysiological Factor in the Life of To-day (Dec. 11th); and Prof. E. L. Collis, on Industry in Relation to Personal and Public Health (Dec. 18th).

The *Harben Lectures* will be given at the same place at 5 P.M. on Fridays, Oct. 18th and 25th, and Nov. 1st, by Dr. R. A. Peters, Whitley Professor of Biochemistry in the University of Oxford. His subject is the Coördinative Biochemistry of the Cell and Tissues.

MANCHESTER ROYAL INFIRMARY: *Post-graduate Courses.*—From Sept. 24th post-graduate lectures and demonstrations at the Royal Infirmary will be held weekly, at 4.15 P.M. on Tuesdays, until Dec. 10th, after which they will be resumed in March. Besides these lectures, there will be others on special subjects, from Friday, Sept. 27th, onwards. Particulars will be found each week in our Medical Diary.

The *Lloyd Roberts Lecture* will be given this year on Wednesday, Nov. 27th, at St. Mary's Hospital, Whitworth-street West, by Mr. Comyns Berkeley, who will speak on the Teaching of Obstetrics and Gynæcology.

HOSPITAL SATURDAY FUND.—The annual collection for the Hospital Saturday Fund will be taken on Sept. 28th, and Lord Burnham, the treasurer, has issued a special appeal in which he calls attention to the fact that the demands of medical science make it imperative that additional support should be given to our hospitals to enable them to take full advantage of the knowledge available for combating disease, and expresses the hope that the public will respond generously. Offers of help should be made to the Secretary of the Fund, 52–54, Gray's Inn-road, London, W.C.1.

A HOME FOR CRIPPLED CHILDREN.—Viscountess Feilding last week opened the Paybody Convalescent Home for Crippled Children at Allesley, near Coventry. A house known as The Elms was presented to the Coventry and District Crippled Children's Guild by Mr. Thomas Paybody, of Coventry, who subsequently gave £2000 in memory of his son towards the cost of adaptation. There are 750 crippled children on the books of the guild.

ROYAL NORTHERN HOSPITAL POST-GRADUATE COURSES.—A course of lectures or lecture-demonstrations on Children's Diseases, for practitioners and others, will be given at the Royal Northern Hospital from Oct. 14th to 22nd, lectures being delivered daily at 2.30 P.M., Saturday and Sunday excepted. Further particulars may be had from the Dean of the hospital, Holloway-road, London, N.7.

POST-GRADUATE COURSES IN BERLIN.—A series of special post-graduate courses will be held in Berlin during October. Particulars of these, and of courses held regularly through the year, may be had from the information bureau of the Kaiserin Friedrich-Haus für das ärztliche Fortbildungswesen, Luisenplatz 2–4, Berlin, N.W.6, which can also arrange for attendance at clinics and accommodation in lodgings.

EPSOM COLLEGE.—A vacancy has arisen for a Salomons Entrance Scholarship of £50 a year. Candidates must be sons of legally qualified members of the medical profession either living or deceased, and only those may apply who were over 11 years and under 14 years of age on Jan. 1st last. The regulations provide that the candidate must show an adequate standard of education for his age, and that his financial condition is such as to make it impossible or difficult to obtain an education at the College without the help of the scholarship. Applications must be sent by Sept. 30th to the Secretary of the College, 49, Bedford-square, W.C.1, from whom the requisite forms can be obtained.

NORTH PERSIAN FORCES MEMORIAL MEDAL.—Dr. G. Stuart, Colonial Medical Services, has been awarded the North Persian Forces Memorial Medal for the year 1928 for his paper, the Serological Diagnosis of the Enterica by the Method of Qualitative Receptor Analysis, written in conjunction with Dr. K. S. Krikorian, and published in the *Journal of Hygiene*, Nov. 26th, 1928, vol. xxviii., No. 2, pp. 105–126. This medal is awarded annually for the best paper on tropical medicine or hygiene published in any journal during the preceding 12 months by a medical officer, of under 12 years' service, of the Royal Navy, Royal Army Medical Corps, Royal Air Force, Indian Medical Service, or of the Colonial Medical Service.

NEW TROWBRIDGE HOSPITAL.—The Marquess of Bath last week opened a new hospital in place of the old inadequate one, which has been sold to the Wiltshire County Council for use as a clinic. The nucleus of the institution is Adcroft House, a large private residence which has been converted into an administrative block; new buildings, all on the ground floor, have been added on each side. On one side are a men's ward of eight beds, three private wards for men, and a children's ward of six beds. On the other side are women's wards of somewhat similar accommodation, including a maternity ward of six beds. In the operating block are an X ray room, and the usual appurtenances. The cost has been about £16,000.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY, Sept. 23rd, to SATURDAY, Sept. 28th.—WESTMINSTER HOSPITAL. Special all-day course in medicine, surgery, and the specialties. 10.30 A.M. to 5.30 P.M. daily.—BETHLEM ROYAL HOSPITAL, S.E. Post-graduate course in psychological medicine. Tues. and Sat. at 11 A.M.—Further particulars from the Fellowship of Medicine.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.

MONDAY, Sept. 23rd.—2.30 to 5 P.M.: Medical, Surgical and Gynæcological Clinics. Operations.

TUESDAY.—2.30 to 5 P.M.: Medical, Surgical, Ear, Nose and Throat Clinics. Operations.

WEDNESDAY.—2.30 to 5 P.M.: Medical, Skin, and Eye Clinics. Operations.

THURSDAY.—11.30 A.M.: Dental Clinics. 2.30 to 5 P.M.: Medical, Surgical, Nose, Throat, and Ear Clinics. Operations.

FRIDAY.—10.30 A.M.: Throat, Nose and Ear Clinics. 2.30 to 5 P.M.: Surgical, Medical, and Children's Diseases Clinics. Operations.

CENTRAL LONDON THROAT, NOSE AND EAR HOSPITAL, Gray's Inn-road, W.C.
MONDAY, Sept. 23rd.—1.30 P.M., Examination and Diagnosis of the Ear.
WEDNESDAY.—1.30 P.M., Examination and Diagnosis of the Nose.

MANCHESTER ROYAL INFIRMARY POST-GRAUDATE COURSE.
TUESDAY, Sept. 24th.—4.15 P.M., Mr. J. P. Buckley: Some points relating to the Ætiology and Treatment of Appendicitis.
FRIDAY.—4.15 P.M., Dr. Catherine Chisholm: The Treatment and Development of the Premature and Immature Infant.

Appointments.

LITTLE, R. H., M.B., B.S. Lond., has been appointed Certifying Surgeon under the Factory and Workshop Acts for the Ringwood District of the County of Southampton.

MCCURRACH, ELIZABETH G., M.B., Ch.B. Aberd., D.P.H., Assistant Medical Officer of Health for Aberdeen.

Westminster Hospital: KENDALL, A. W., M.B., B.S. Lond., Senior Resident and Casualty Officer; HUTTON, A. E., L.R.C.P. Lond., M.R.C.S., Resident House Physician; CAUDWELL, C. E., L.R.C.P. Lond., M.R.C.S., Resident House Surgeon; TOLAND, C. P. K., L.R.C.P. Lond., M.R.C.S., Resident House Physician; MORGAN, J., M.B., B.S. Lond., Resident Obstetric Assistant and House Physician to the Children's Department.

Vacancies.

For further information refer to the advertisement columns.

Aberystwyth Infirmary and Cardiganshire General Hospital.—H.S. £200.
Albert Dock Hospital, Connaught-road E.—Surgeon.
Aylesbury, Royal Buckinghamshire Hospital.—Res. M.O. At rate of £180.
Barrow-in-Furness County Borough.—Asst. M.O.H. and Asst. Tub. O. £600.
Bath, Royal United Hospital.—H.S. At rate of £150.
Bedford County Hospital.—Asst. H.S. At rate of £130.
Belgrave Hospital for Children, 1, Clapham-road, S.W.—H.S. Also Asst. H.P. Each at rate of £100.
Birkenhead General Hospital.—Cas. S. £100.
Birmingham General Hospital.—Two Res. Anæsthetists. Each £120. Also three H.S.'s. Each £70.
Birmingham, Selly Oak Hospital.—Res. Physician. £400–£600.
Blackburn and East Lancashire Royal Infirmary.—Fourth H.S. £130.
Bournemouth, Royal Victoria and West Hants Hospital.—H.S. At rate of £120.
Bradford, Royal Eye and Ear Hospital.—Jun. H.S. £120.
Brighton, Royal Sussex County Hospital.—H.P. £150.
Bristol City and County Mental Hospital.—2nd Asst. M.O. £500. Also 3rd Asst. M.O. £350.
Cape Town University.—Asst. Anatomist. £750.
Chester Royal Infirmary.—H.S. £120.
City of London Hospital for Diseases of the Heart and Lungs, Victoria Park, E.—H.P. At rate of £100.
Coventry City.—M.O.H. £1225.
Epsom, Surrey, Norton Mental Hospital.—Fourth Asst. M.O. £425.
Exeter, Royal Devon and Exeter Hospital.—Hon. Physician.
Evelina Hospital for Children, Southwark, S.E.—H.S. At rate of £120.
Federated Malay States, Central Health Board.—Three M.O.'s for Estate Service. Each at rate of £980.
Godalming, King George V. Sanatorium.—Jun. Asst. M.O. £500.
Golden-square Throat, Nose, and Ear Hospital, W.—Registrar. Also Hon. Anæsthetist.
Gloucester, Gloucestershire Royal Infirmary, &c.—Hon. S. to Ear, Nose and Throat Dept. Also First H.S. At rate of £135.
Great Yarmouth General Hospital.—Sen. H.S. £150.
Grosvenor Hospital for Women, Vincent-square, S.W.—Res. M.O. At rate of £100.
Guy's Hospital.—Astley Cooper Studentship.
Hampstead Parish of St. John, New End Hospital.—Jun. Res. Asst. M.O. At rate of £200.
Hospital for Sick Children, Great Ormond-street, W.C.—Asst. Path. and Research Fellow. £450. Also H.S. and H.P. Each at rate of £100.
Hospital of St. John and St. Elizabeth, Grove End-road, N.W.—Res. H.S. At rate of £75.
Hull Royal Infirmary.—Asst. H.P. At rate of £130.
Isleworth, West Middlesex Hsopital.—Res. Asst. Med. Supt. and Asst. M.O. £450.
Lewisham Metropolitan Borough.—Asst. M.O.H. and Maternity and Child Welfare M.O. £650.
Liverpool, David Lewis Northern Hospital.—Res. H.S. and Res. H.P. Each at rate of £100.
Liverpool, Royal Southern Hospital.—Medical Tutor and Registrar.
London Homœopathic Hospital, Great Ormond-street, W.C.—Asst. Surg. for Dis. of Eye.
London Hospital, E.—First Asst. and Registrar. £300.
London Jewish Hospital, Stepney Green, E.—Hon. Asst. S. for Gynæcological Dept., Hon. Asst. Radiologist. Also Hon. M.O. for Actino-Therapeutic Dept.
London Lock Hospital, 91, Dean-street, W.—H.S. At rate of £200.
London Temperance Hospital, Hampstead-road, N.W.—Res. M.O. At rate of £175.
Manchester Babies' Hospital, Burnage-lane, Levenshulme.—Jun. Res. M.O. At rate of £50.
Manchester Ear Hospital, Grosvenor-square, All Saints.—H.S. At rate of £150.
Manchester, Salford Royal Hospital.—Two H.S.'s. Also Cas. H.S. Each at rate of £125.
Margate, Royal Sea Bathing Hospital.—H.S. At rate of £100.
Maudsley Hospital, Denmark Hill, S.E.—Asst. M.O. £300.
Mildmay Mission Hospital, Austin-street, Bethnal Green, E.—Jun. Res. M.O. Also Asst. Cas. O. Each at rate of £100.
National Dental Hospital, Gt. Portland-street, W.—Hon. Anæsthetist.
Northampton, Northamptonshire County Council.—M.O.H. and School M.O. £1,100.
North Middlesex Hospital, Silver-street, Edmonton, N.—Res. M.O. £200.
Norwich, Norfolk and Norwich Hospital.—H.S. £120.
Nottingham Children's Hospital.—Res. H.P. At rate of £150.
Poole, Cornelia and East Dorset Hospital.—H.S. At rate of £150
Prince of Wales's General Hospital, Tottenham, N.—Sen. H.P. Sen. H.S., and Special H.S. Each at rate of £120. Also Jun. H.P., and Two Jun. H.S.'s. Each at rate of £90.
Princess Louise Kensington Hospital for Children, North Kensington.—H.P. At rate of £75.
Queen's Hospital for Children, Hackney-road, E.—H.P. Also Cas. O. Each at rate of £100.
Queen Mary's Hospital for the East End, E.—Anæsthetist for the Dental Dept. £25.
Rotherham Hospital.—H.P. £180.
Royal Free Hospital, Gray's Inn-road, W.C.—Sen. Res. M.O. £150. Also Cas. O. £150.
Southampton, Royal South Hants and Southampton Hospital.—Cas. O. At rate of £120.
Stafford, County Mental Hospital.—Second Asst. M.O. £600.
Stockport County Borough.—Clin. Tub. O. and Sen. Asst. M.O.H. £750.
Stockton-on-Tees, Stockton and Thornaby Hospital.—Jun. Res. M.O. £150.
Sudan Medical Service.—M.O. £E720.
Swansea Hospital.—H.S. £150.
West London Hospital, Hammersmith, W.—Hon. Registrar for Throat, Nose, and Ear Dept. Also House Officer for Children's Dept. At rate of £150.

Births, Marriages, and Deaths.

BIRTHS.

ARCHER.—On Sept. 11th, at York-place Nursing Home, to Frances, wife of Dr. G. E. Archer, of Victoria Park, Manchester, the gift of a son.

LINDSAY.—On Sept. 11th, at 47, Harefield-road, Brockley, the wife of Sidney S. Lindsay, M.B., B.S., M.R.C.S., of a daughter.

LONGFORD.—On Sept. 12th, the wife of Dr. W. U. D. Longford, Holywood, County Down, Ireland, of a son.

ROLES.—On Sept. 14th, at Fitzjohn's Avenue, Hampstead, the wife of Francis C. Roles, M.A., M.R.C.P., of a daughter.

SHAW.—On Sept. 11th, at Trafalgar-lawn, Barnstaple, N. Devon, the wife of Dr. S. C. Shaw, of a son.

WAKELY.—On Sept. 9th, at Carshalton, the wife of Dr. A. S. Wakely, of a son.

WHITTINGTON.—On Sept. 9th, at Oakfield, Sutton, Surrey, the wife of Theodore H. Whittington, M.D., of a son.

MARRIAGES.

ELGOOD—FRANCIS.—On Sept. 9th, at St. Martin-in-the-Fields, London, John Elgood, M.B., F.R.C.S., to Christine Phyllis Francis, M.B., B.S., elder daughter of Mr. and Mrs. J. E. Francis, of the Athenæum Press, London.

FLIND—RUFFELL SMITH.—On Sept. 10th, at St. Michael's Church, Highgate, James Flind, M.B., B.Ch., D.P.M., to Joan, younger daughter of Mr. and Mrs. Ruffell Smith, of Moorhaven, Stormont-road, Highgate.

WESTLAKE—BROWN.—On Sept. 9th, at the Wesleyan Church, Deal, Henry John William Jennings Westlake, B.Sc., M.R.C.S., L.R.C.P., to Evelyn Cresdee, only daughter of Mr. H. G. Brown, Solicitor, and Mrs. Brown, of Melsonby, Grange-road, Deal.

DEATHS.

BLUNT.—On Sept. 12th, at Linden Villas, Westfield-road, Wakefield, Henry Brine Blunt, M.B., C.M., aged 70 years.

GIFFARD.—On Sept. 15th, at a nursing home in Bournemouth, Douglas William Giffard, M.R.C.S. Eng., L.S.A., formerly of Brighton, aged 81 years.

HARRIS.—On Sept. 6th, at Hartwood House, Chorley, Lancashire, James Alfred Harris, M.D.

MARSHALL.—On Sept. 10th, at Inglewood, Eldorado-road, Cheltenham, Dr. Lewis Marshall, aged 80.

SLINGER.—On Sept. 10th, Robert Townley Slinger, F.R.C.S., of Foregate street, Worcester, aged 49 years.

WARNER.—On Sept. 8th, suddenly, after an operation, Winifred Warner, M.B., B.S., of Gold Hill House, Chalfont St. Peter.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

CONGRESS OF THE ROYAL SANITARY ASSOCIATION OF SCOTLAND.

THIS Association, which has lately held its fifty-fifth annual congress at Kirkcaldy, may be said to have done more than any single agency to raise the standard of public health administration in Scotland. It combines the professional and administrative in a specially intimate way, and the result is the cultivation of understanding between officer and authority both central and local.

This year's President is Mr. Harvey, of Edinburgh, for many years convener of the health committee. In his opening address he advocated propaganda by health authorities on the ground that removal of the poor-law stigma, along with the prolonged period of unemployment, must be counter-balanced by persuading people to look after themselves and so avoid hospital. In a popular lecture Dr. Parlane Kinloch, Chief Medical Officer of the Department of Health for Scotland, sketched the growth of health services from the days of the old "parochial boards" to the modern system of school health administration, maternity service, and child welfare, milk inspection, meat inspection, housing, tuberculosis, insurance, therapeutic substances protection, and others. All these date from 1908 and most of them are post-war. In describing the regional scheme of hospital services and general health services and the facilities for specialised advice and treatment, Dr. Kinloch commented on the absence of team-work among doctors, and stressed the importance of regional development as a means of securing immediate advance towards an efficient and economic health service.

Dr. John Guy, deputy medical officer of health and tuberculosis officer for Edinburgh, read a paper on the Economic and Nutritive Aspects of Diet. On a theoretical basis, and giving adequate amounts of all the constituents, he found that a fully balanced and varied ration could be had on 6*s.* a week, but this required some knowledge of food values. The cheapest form of diet was one consisting chiefly of oatmeal, herring, bread, margarine, and potatoes. This worked out at about 3*s.* 6*d.* to 3*s.* 9*d.* per head per week. But such a diet was monotonous and unattractive—a failing which, in his view, led to the use of condiments by the poor. The town-dweller needed a variety in his diet such as the agricultural labourer did not demand. About 18 months ago Dr. Guy studied the dietaries of some 30 families in Edinburgh, their cost ranging from 4*s.* 1*d.* to 9*s.* 9*d.*, with an average of 7*s.* He found that only 8 of the 30 gave the amount of protein usually accepted as necessary in the diet of a person at rest, and if these 30 diets were typical vast numbers of people must be living on slightly over bare subsistence diets. In the buying of food greater ignorance was shown than in the buying of any other commodity.

In an address on Town and Regional Planning Mr. George D. Macniven, F.R.I.B.A., said that building by-laws had laid a good foundation in securing a certain minimum standard of air-space, light and ventilation, and restraint of overcrowding, but that, under those very by-laws, the suburbs had grown into utter drabness and monotony. This showed that something had been lacking. Town-planning aimed at preventing disease, and therefore promoting health; at preventing ugliness and preserving beauty; at preventing congestion and confusion, and therefore safeguarding industrial and commercial efficiency. Mr. James McAllan, veterinary officer for the city of Aberdeen, pleaded for the prohibition of hawking meat from barrows and stalls on the street. He regretted the great flaw in the definite, uniform, and national system of meat inspection—namely, that the local authorities had not greater powers for the actual control of the handling and transport of meat and meat food products.

The Congress was attended by some 500 delegates. The President-elect is Dr. T. F. Dewar, of the Scottish Health Department.

PAINFUL FIBROSITIC NODULES.

To the Editor of THE LANCET.

SIR,—I suggest that "M.B., B.Ch." should try either diathermy or ionisation. Dr. Lewis Jones, in his "Medical Electricity," states that "These cases are much relieved by ionisation, and salicylic or iodine ions may be used."

I am, Sir, yours faithfully,

MAY RATHBONE.

Keston, Hayes, Kent, Sept. 14th, 1929.

THE VENTILATION OF A PICTURE THEATRE.

A REPRESENTATIVE of THE LANCET lately visited the new Commodore Super Cinema at Hammersmith which is to hold 3000 people. In such a building everyone ought to have plenty of warm, clean, dry air, and, recognising this necessity, the proprietors of the theatre have spent some £15,000 on installing a modern ventilating plant.

That there may be no shortage, air will be provided for 3500 people at the rate of 1500 cubic feet per person per hour, in six changes. Seeing that 1 cubic foot of air weighs about one-twelfth of a pound, the hourly supply for each person will be some 125 lb., or rather over a twentieth of a ton, and the total supply of the theatre about 200 tons of air per hour. The magnitude of the task of ventilation is thus evident. The air is taken from the roof of the building, 60 feet above the street level, and is drawn through a pre-heater, where if necessary it is warmed to prevent it from freezing the washing water, which it meets in the cleansing chamber as an impalpable mist, emitted from myriad jets. Here the gross impurities fall out, and no drops of water go further, being baffled by the eliminator plates. Through these the air, clean but saturated with moisture, passes to the secondary tempering coils and then to the fan which carries it to the roof of the theatre, where it is further warmed if required, and distributed above the heads of the visitors, to be drawn out at last under their feet. It is intended that the air supplied shall never have a wet-bulb temperature lower than 52° F., but it is important that distribution shall be made at a desired temperature. This is controlled from the ventilating engine-room where an indicator shows, by thermo-electric circuits, the temperature in any one of some dozen sections of the house. The operator can alter the temperature as he likes, having beside him another board with five lines of compressed air relay switches, each of which controls one of the five unit steam heaters which, in each of the sections, warms the incoming air.

There will be no cold draughts in this theatre when the doors are opened, for there will always be a positive pressure of warm air within it. The visitors, even if their boots and clothes are wet, will not be chilled. Their clothing will tend to dry without chilling them, and the risk of infection from person to person will be lessened by the withdrawal of expired air towards the feet. Fog is mostly removed, so the pictures will be seen the more clearly. No one will be inclined to sleep because the atmosphere is stuffy, and the audience's eyes and ears will be relatively alert. These are all benefits for the audience, while the management will gain by a reduction in the cost of cleaning the theatre and by the longer life of all furniture—owing to the lessened quantities of dust and sulphuric acid entering the house—and by the continuing patronage of people who find themselves comfortable. We are informed that a bacterial control on the ventilation would have been arranged had the designer found any literature on the subject. If such information should become available, and if it seems expedient, he hopes he may be able to add some suitable odourless antiseptic in an effective proportion to the washing water in the cleansing chamber.

We are obliged to the management of the theatre for permitting a view of the premises, and to Mr. H. A. Stirzacker, technical manager to Messrs. J. Jeffreys, the contractors for the heating and ventilation, for explaining the ventilating plans to our representative.

THE AUTUMN PHOTOGRAPHIC EXHIBITION.

THE seventy-fourth annual exhibition of the Royal Photographic Society of Great Britain, now being held at 35, Russell-square, W.C., keeps up the high standard of previous years. Medical men will find their chief interest in the scientific section, where are to be seen a series of pictures of mouse tumour cells taken with the aid of the ultra-violet miscroscope at a magnification of 1800. Here also are photomicrographs of the interior of the eye, illustrating the pathological changes resulting from lead poisoning, high blood pressure, and other conditions. A set of colour photographs of the eye by Mr. L. D. Redway merits attention. Dr. G. H. Rodman shows studies of the house fly and a graphic representation of the way in which a nettle stings, while Kodak, Ltd., are well represented with a fine set of X ray photographs, including one showing clearly renal calculi. The exhibits in the natural history room bear witness to the patience and ingenuity necessary to the achievement of success in this branch of the art. Of particular interest are flashlight photographs of a stoat, and of a honey-bee in flight, the latter showing to perfection the detail of the wing. In the library are shown the various stages in the reproduction of illustrations by the half-tone, line, photogravure, and photo-litho processes. In the pictorial section the most pleasing among many attractive prints is No. 137. No visitor should miss the lantern slides and colour plates in the studio, and a demonstration of natural colour cinematograph films. The exhibition remains open until Oct. 12th.

A Review
OF THE
NERVOUS AND MENTAL ASPECTS OF PERNICIOUS ANÆMIA.

BY DOUGLAS McALPINE, M.D. GLASG., M.R.C.P. LOND.,
PHYSICIAN IN CHARGE OF THE DEPARTMENT FOR NERVOUS DISEASES, MIDDLESEX HOSPITAL; ASSISTANT PHYSICIAN, HOSPITAL FOR EPILEPSY AND PARALYSIS, MAIDA VALE.

FRESH interest in the subject of pernicious anæmia in all its bearings has dated from the appearance of Hurst and Bell's [9] paper on achlorhydria in subacute combined degeneration of the cord, Price-Jones's [15 16] observations on the constancy of megalocytosis in pernicious anæmia, and more recently the excellent results of Minot and Murphy's [11] liver diet.

I have here made an attempt to review the neurological and mental aspects of the disease in a wider sense than is usual in text-books, to deal with certain points in early diagnosis, and finally to consider the results of liver therapy on the nervous complications. For this purpose 24 cases have been studied. Although relatively few in number, they serve to illustrate the points mentioned above.

In the first place, with regard to the incidence of so-called "subacute combined degeneration of the cord" I will quote only one set of figures—namely, those of Woltman [20] who in 1919 examined the nervous system in 150 cases of pernicious anæmia. In just over 80 per cent. he found "indisputable evidence of destruction of nerve parenchyma."

PATHOLOGY OF SUBACUTE COMBINED DEGENERATION OF THE CORD.

There are points regarding the nature of the changes in the cord which are still unsettled, but the following, I think, fairly represents the general consensus of opinion. Two types of lesion occur: (1) Foci in which the myelin sheaths of the nerve-fibres are destroyed, resulting in the formation of numerous vacuoles. These foci are found in the white matter, especially in the posterior columns, cerebellar tracts and pyramidal tracts, both crossed and direct. They make their appearance first in the lower cervical and upper half of the dorsal region of the cord. They are irregular in shape and tend to occur near the periphery of the cord. This distribution suggests that they bear a close relationship to the small entering arterioles. These foci of degeneration constitute the essential lesion. (2) Secondary degenerations in the long tracts of the cord; these occur only in the more chronic cases and can be recognised by their more homogeneous distribution. They result from the destruction of the axis-cylinders, a further stage of the initial lesion. Most authorities are agreed that the posterior roots are not affected. With regard to the peripheral nerves, according to Buzzard and Greenfield,[3] they are healthy. Russell, Batten, and Collier,[17] in their original paper, written in 1900, described the pathological findings in nine cases; only one of these showed definite changes in the peripheral nerves. Yet Collier [5] has recently written "some degeneration is always present in the peripheral nerves." The literature contains very few references to this point and it is obvious that this part of the nervous system has not received the proper attention of those who have studied the pathology of this disease. The cases in which a careful examination of the peripheral nerves has been made are so few that no conclusions can be drawn from them. It may be remarked, however, that definite changes have been met but they are not constant.

EARLIEST SYMPTOMS OF INVOLVEMENT OF THE CENTRAL NERVOUS SYSTEM.

Various forms of *paræsthesiæ* are common at the onset, such as a sensation of tingling, numbness, pins and needles, coldness, tightness, &c. Later in the disease a feeling as if something were tied round the leg or a sensation of walking on cotton-wool is not uncommon. In eight cases pain in the lower limbs was a prominent feature, usually in conjunction with one of the other forms of paræsthesiæ. It was generally described as sharp and stabbing, sometimes being sufficiently severe as to interfere with sleep.

With regard to the distribution of the paræsthesiæ, they were always referred to the periphery of the limbs. In a few cases one limb was affected before the others but the distribution soon became symmetrical. In approximately half the cases the paræsthesiæ were first felt in the feet, the big toe being, not uncommonly, the starting-point; in all these cases the hands were affected at a later date. In eight cases the hands and feet were affected at the same time; in five cases the hands were attacked first. In one case a "pins-and-needles" sensation was felt in the fingers of one hand for seven years before becoming generalised. The paræsthesiæ tend to spread centrally, in the case of the arms from the fingers up to the elbows and in the legs from the toes up to the knees, thighs, and in some cases to the waist. Paræsthesiæ generally precede the onset of motor disability, either in the form of paresis or ataxia, by some months, and in two cases in this series by seven and eight years respectively, although in acute cases difficulty in walking is noticed within a week or two of the onset.

Alteration in the Reflexes.

A spastic paraplegia is commonly regarded as the usual form of the disease, the deep reflexes in the lower limbs disappearing shortly before death. The following table shows the condition of the reflexes in the lower limbs in 24 cases, when first coming under observation:—

Cases.	Knee-jerks.	Ankle-jerks.	Plantar responses.	Cases.	Knee-jerks.	Ankle-jerks.	Plantar responses.
6	++	++	↑	3	+	+	↓
2	+	0	↑	3	+	0	↓
3	0	0	↑	6	0	0	↓
1	+	+	↑↓				

From this table it will be seen that there were only 11 cases (45 per cent.) in which there was unequivocal evidence of pyramidal tract involvement.

INTERPRETATION OF SYMPTOMS AND SIGNS.

In the earliest stage of the disease there may be no loss of sensation in the extremities, despite the definite subjective sensations felt by the patient. Eventually, however, two varieties of sensory loss may occur: (1) Diminution or loss of vibration sense, either alone or occasionally accompanied by impaired postural sensibility in the toes and fingers. The other forms of sensation are unaffected. This type of dissociated sensory loss is explained by the commencement of the disease in the posterior columns, usually the columns of Goll, which convey the impulses of postural sensibility and vibration sense up to the sensory nuclei in the medulla. (2) Impairment of all forms of sensation in the periphery of the limbs in the "glove-and-stocking" distribution, so characteristic of a peripheral neuritis. In this series of cases these two forms of sensory loss occurred with about equal frequency when the patients first came under observation. The second type of sensory loss can best be explained by a lesion of the peripheral nerves. Further proof of this is afforded by the occurrence of pains "cramp-like" or sharp in the limbs, accompanied sometimes by definite tenderness. Such pains

certainly are due to effects of the neurotoxin on the peripheral sensory neurone. Pains in the lower limbs were a prominent feature in a third of the cases in the present series. When we come to study the reflexes, I have already shown that absent deep reflexes in the lower limbs, with or without an extensor plantar response, occurred in over half the cases. The abolition of the deep reflexes has been explained by the effect of the disease on the posterior columns. There is no anatomical proof, however, that the reflex arc passes through these columns. An easier solution to the problem would be to implicate the posterior root or posterior root entry zone. However, the consensus of opinion amongst those who have studied the pathology of the disease seems to be that these parts escape. Again, when looked at from the point of view of anatomy, the abolition of the deep reflexes on the basis of a cord lesion is equally difficult to explain. As previously stated, the cord is first affected in its middle third. Yet it is by no means uncommon to find the ankle-jerks disappearing early in the disease. This reflex is situated in the lowest part of the cord—viz., sacral segments 1 and 2. These points, therefore, suggest that the interruption of the reflex arc does not take place in the cord or posterior root, but in the peripheral nerve.

It is reasonable to deduce from this fact and the peripheral type of sensory loss that the peripheral sensory neurone is almost constantly affected, either alone for a time, or concurrently with the spinal cord.

Mental Changes in Pernicious Anæmia.

These are briefly dismissed in most text-book descriptions of the disease. That mental changes do occur more frequently than are supposed may be deduced from the fact that within recent years several important papers on this subject have appeared. Addison,[1] in his original description of pernicious anæmia, refers to "occasional wandering and indeed a terminal delirium." We are not here concerned with these terminal manifestations, but with those arising early in the disease. In 1905 Langdon,[10] in a paper entitled Nervous and Mental Manifestations of Pre-pernicious Anæmia, drew attention to a group of cases in which nervous and mental symptoms might precede the typical picture of pernicious anæmia. Amongst the mental symptoms he noted peevishness and a gradual mental deterioration, varied, however, by periods during which the patient more or less returned to normal. In these cases, when first seen, in addition to the mental changes, there might be symptoms and signs pointing to involvement of the spinal cord, prior to the development of the pernicious feature of the anæmia. His views were severely criticised, but with the knowledge that has accumulated since then regarding the disease it is now evident that such cases occur not uncommonly. With regard to the mental side of the question his views have recently received striking confirmation by the work of Warburg and Jorgensen,[19] which will be mentioned later. Their paper, incidentally, contains an excellent bibliography relating to the mental changes in pernicious anæmia. Only one or two of the more important papers on the subject will be mentioned. Pickett,[13] in six cases of pernicious anæmia, noted shallow confusion with impairment of ideas of time and space. Delusions, especially of a persecutory character, he believed to be common. Barrett,[2] in an important paper, studied the mental changes in 11 cases. In nine of these he made a histological examination of the brain. The commonest symptoms were delusions of persecution, sometimes systematised, disorientation in time and space, confabulation, irritability, but little mental deterioration. The blood picture in nearly all the cases was that of a severe pernicious anæmia. In over half the cases there was a psychopathic family history. Histologically all the cases showed varying degrees of destruction of the long tracts in the cord. The changes in the brain were not uniform but the commonest findings were: (1) rarefaction of perivascular nerve-fibres, (2) endarteritis, (3) changes in the nerve-cells, (4) in several cases areas of focal disintegration of the myelin sheaths.

Woltmann [21] described the histological changes in the brain in seven cases. Amongst his conclusions are the following: (1) Not only do degenerated areas, such as are typically found in the posterior and lateral columns of the spinal cord in pernicious anæmia, occur in the medullary portion of the brain, but they do so with about the same frequency, though their demonstration may be rendered more difficult. (2) In addition, there is sometimes a diffuse degeneration, which though it is, as a rule, somewhat more marked in the long association traces, also occurs in the short commissural fibres passing from one gyrus to another. (3) The grey matter is by no means immune from the destructive process, which usually occurs focally around the pyramidal cells, some of which may be destroyed. (4) Well-marked psychoses, such as are occasionally associated with pernicious anæmia, probably have little or nothing to do with these destroyed areas, but the milder mental manifestations, such as somnolence and apathy, may be dependent on them.

In the present series the mental condition of the patient was investigated in 17 cases. In 11 of these some departure from the patient's normal mentality was noted. In three cases this merely amounted to depression with lack of mental energy.

Depression with Lack of Mental Energy.

In none of these cases was the blood count below 3,500,000 red cells, so that anæmia, per se, could not be held responsible for the condition. In one of the cases marked improvement in the patient's mental outlook followed liver treatment. In one other the depression remained; in this case the patient had been on liver treatment for one year before coming under my observation and there had been no improvement in his neurological condition. The remaining case was as follows:—

Male, aged 50, was referred to me from the Western Ophthalmic Hospital on account of recent retinal hæmorrhages. Nothing of note was found in his cardiovascular system, and the urine was free from albumin. Further questioning of the patient elicited the fact, which he had not previously mentioned, that for the past three months he had noticed a numb feeling in his legs, and that his feet always felt cold. He showed a slight impairment to all forms of sensation below the knees, with loss of vibration sense below the level of the anterior superior iliac spine. The knee-jerks were present, but the ankle-jerks could not be obtained. The right plantar response was equivocal; the left flexor. The average blood count before treatment was as follows: R.B.C., 3,500,000; Hb., 77 per cent.; C.I., 1·05.

A fractional test-meal showed complete achylia. He was in hospital from December, 1927, for three months. His mental condition throughout was one of mild depression and indifference. He had never previously felt depressed. His blood picture slowly improved under liver treatment, but there was no corresponding improvement in his neurological condition. He committed suicide three months after leaving hospital.

Confusion with Failure of Memory.

Four cases showed a mild state of confusion, which varied in intensity in the same patient from time to time. Failure of memory, for both recent and past events, indifference and even apathy, slow cerebration, and a tendency to somnolence were the prominent features in these cases. The following is an example of this group.

Male, aged 61, was seen by me early in 1928. According to his son, following an "influenzal cold" in 1924, a marked change in his mentality was noticed. He had always been regarded as a man of intellectual type, but he then began to lose interest in his work and made elementary mistakes. He became childish in his general outlook on life, and often "seemed to be in a dream." This mental deterioration was gradual. In 1926 he developed numbness in his fingers and toes, which persisted. When examined in June, 1928, he appeared mentally dull and indifferent. His memory was markedly defective for both recent and past events. There were no hallucinations or delusions or disorientation in time or space. There was no definite paresis of the lower limbs. The knee-jerks were sluggish on admission to hospital, and

soon disappeared. The ankle-jerks were absent. The plantar responses were equivocal. There was hypoæsthesia to all forms of sensation below the knees. Vibration sense was diminished up to the level of the seventh rib. There was slight loss of postural sensibility. A blood count showed R.B.C., 3,570,000; Hb., 67 per cent.; C.I., 0·93. There was complete achylia. The Wassermann reaction was negative in the blood and cerebro-spinal fluid. As a result of three months liver treatment he lost 13 lb. in weight. His blood picture, however, showed slight improvement. On discharge there was little or no alteration in his neurological or mental condition. Since then he has continued liver treatment as well as hydrochloric acid. When seen on July 20th, 1929, his condition was about the same.

Toxic Psychosis.

In the following three cases a definite toxic psychosis, with symptoms of a paranoidal nature, was present.

Female, aged 57, was admitted under my care in March, 1929. She had enjoyed good health until the summer of 1927, when she began to experience numbness in the big toe of either foot, and at times sharp pains in her legs. Later a frozen feeling, with numbness, was felt in the hands. These symptoms became aggravated, and later difficulty in walking was experienced. She was inclined to be sleepy, depressed, and irritable. She thought that no one wanted her, that everyone was looking at her, and that her neighbours had taken a dislike to her. On admission she appeared depressed, but otherwise normal mentally. There was no history of depression in the past. There was slight paresis of both lower limbs, with loss of deep reflexes. Both plantar responses were flexor. There was "glove" anæsthesia in her hand and marked loss of all forms of sensation below the knees. A blood count showed: R.B.C., 2,950,000; Hb., 70 per cent.; C.I., 1·3. There was complete achylia. She was treated with half a pound of liver daily, and dilute hydrochloric acid. The mental symptoms quickly disappeared. The blood picture gradually improved. On discharge from hospital on March 22nd: R.B.C., 4,932,000; C.I., 0·95. The paræsthesiæ had become much less pronounced, and she was able to walk with the support of a stick. In June, 1929, she reported herself as still further improved.

Male, aged 46, was admitted into Maida Vale Hospital, under the care of my colleague, Dr. A. Feiling, in April, 1924. In October, 1922, he first complained of pain and numbness in the ankles, which gradually spread up to the thighs. In September, 1923, he was admitted to the National Hospital, Queen-square, where a diagnosis of subacute combined degeneration of the cord was made. After about a month in hospital he became mentally confused and suicidal. He was discharged to an infirmary, but made a good recovery within a few weeks. In March, 1924, the left leg became weak, and he was unable to walk. On examination in April, 1924, he appeared pale and depressed. There was a typical glossitis. The legs were spastic, with double extensor plantar responses. There was hypoæsthesia to cotton-wool and pin prick below the knees. Vibration sense and postural sensibility were much impaired. A blood count showed: R.B.C.; 3,200,000; Hb., 65 per cent.; C.I. 1·0. There was complete achylia. At the beginning of June, 1924, he developed persecutory ideas; he thought that his food was being poisoned, and that everyone was against him. He discharged himself from hospital, and died in July, 1925.

The following case is of especial interest. Female, aged 41, early in 1925 first experienced a tingling sensation in the ring and little fingers of the left hand, followed later by a pins-and-needles sensation in the same fingers, an aching and cold feeling around the ankles, and dull aching pains in the feet and legs. In March she noticed that her walking was affected. In May she was admitted to the West Middlesex Hospital on account of the pains in the legs and vomiting. After three days there she became excitable and at times violent. She took off all her clothes, refused to eat, thought she had been cut up, and threatened to commit suicide because she was being ill-treated. She was transferred to Springfield Mental Hospital on May 20th.

I am indebted to Dr. R. Worth for permission to use the notes, of which the following is an extract:—

Past and Family History.—She had never before suffered from any form of nervous breakdown. One sister had been insane for a week at the climacteric. Otherwise there was no psychopathic history in the family.

On admission she showed some clouding of consciousness. She was not disorientated, but her memory for recent events was very poor, for current and remote events fair. She was suffering from delusions—e.g., stated that she had been through an operation that morning. She was somewhat restless. She complained of abdominal pain, and there was a very offensive diarrhœa. No definite neurological signs were noted. There was slight motor weakness in the lower limbs. The deep reflexes were active, and the plantar responses flexor in type.

June 2nd, 1925.—Mental condition about the same, but depression more marked than on admission. Abdominal pain still complained of, and diarrhœa continues. 3rd: Quiet; rather confused. Memory for current events, poor. Signs of colitis abating. 10th: Improvement in mental condition. She answers questions sensibly and is beginning to take an interest in her surroundings. Diarrhœa has now stopped, and she appears stronger. 17th: Much better mentally and physically. The only mental abnormality now present is a tendency to worry over trifles. July 24th: Improvement in mental condition has been maintained. August 8th: Discharged as recovered.

She was admitted to the Hospital for Epilepsy and Paralysis, Maida Vale, six weeks later—Sept. 22nd—under the care of Dr. C. M. Wilson, complaining of weakness and numbness of the legs, unsteadiness in walking, and a feeling as if she was walking on cushions. Her arms felt stiff and numb up to the elbows. Mentally she appeared somewhat emotional and her attention was poor. The tongue was red and glazed. There was slight paresis in the legs. The knee-jerks were active; the ankle-jerks were absent. The plantar responses were flexor. A blood count showed R.B.C., 3,288,000; Hb., 57 per cent.; C.I., 1·0. Wassermann negative in blood and cerebro-spinal fluid. There was complete achylia. She left hospital in December, 1925, improved. Unfortunately this patient cannot now be traced.

The chief interest in this case lies in the association between the psychotic state and the attack of diarrhœa, which was almost certainly a symptom of pernicious anæmia.

The Relation Between Mental Symptoms and Pernicious Anæmia.

Warburg and Jorgensen,[19] in a recent paper which should be read in the original, draw attention to the occasional association of psychoses and neurasthenia, with achylia gastrica and megalocytosis and discuss the relationship between this syndrome and pernicious anæmia. In their conclusions they state that there is a chronic pathological condition, associated with achylia gastrica, which covers a great many cases of neurasthenia and some cases of early psychoses, and that these mental disorders are often associated with mild spinal symptoms, glossitis, and megalocytosis. The epoch of pernicious anæmia is a rare and late stage in this condition, in which, not infrequently, one observes anæmia with a low colour-index at an early juncture. The majority of their cases improved with liver treatment. Their findings fit in well with Langdon's original conception of a pre-pernicious anæmia, in which mental or neurological symptoms may first dominate the clinical picture. With regard to the incidence of achylia in the psychoses, Ford-Robertson [8] has recently investigated this matter as part of an inquiry into the relationship between gastro-intestinal infection and mental disorder. He comes to the conclusion that gastric dysfunction, especially hypochlorhydria, is present to a much greater extent than in normal persons. In 14 cases (12 per cent.) he found absence of free hydrochloric acid after a test-meal; whilst 35 cases showed a diminished amount of free hydrochloric acid.

Reviewing the cases in the literature and those referred to in this paper, it seems certain that mental changes of varying severity occur not uncommonly in pernicious anæmia, sometimes in its earliest or pre-pernicious stage. The condition may range from a state of depression and lack of mental energy to a mild and even severe confusional psychosis. Frequently paræsthesiæ in the limbs may accompany or follow the mental symptoms, indicating the generalised effect of the neurotoxin on the central nervous system.

The early recognition of these symptoms, by means of an examination of the blood and gastric contents and their adequate treatment, may result in considerable improvement.

Diagnosis of Pernicious Anæmia.

What are the necessary criteria for the diagnosis of this disease? First and foremost comes *achylia*, which was present in each of the 21 cases in which a gastric analysis was made. A fractional test-meal is unnecessary. A stomach-tube should be passed before the test-meal is given in the morning, and the presence or absence of free hydrochloric acid determined in the resting gastric juice. Specimens taken one and two hours after the test-meal should be similarly tested. This can be done qualitatively by means of a drop or two of methyl-orange, which is added to the specimen. If free hydrochloric acid is present an orange colour develops. This test can be carried out by the general practitioner without any special apparatus and without taking up too much of his time.

Secondly comes the *examination of the blood*. This may show a definite picture of pernicious anæmia—e.g., low cell count with high colour-index and megalocytosis. Not infrequently, however, the red cells are but little reduced in number or may even exceed five millions; in such cases the colour-index may be low—e.g., 0·7 or 0·8. In the present series several cases which were under observation in hospital, and on whom blood counts were performed on an average three times a week before and after treatment with liver, showed a colour-index not exceeding 0·9. Campbell and Conybeare,[4] in a large series of cases of pernicious anæmia, found the colour-index to be above unity in only 60 per cent. of their cases. I think this point ought to be emphasised, as the majority of text-books lay undue stress on a high colour-index as an important feature in the diagnosis of pernicious anæmia. There is one feature of the blood picture which is constant before and probably after liver treatment—namely, an increased diameter of the red cells or megalocytosis. Price-Jones [15 16] originally described this condition and a method by means of which the average diameter of the red cells is arrived at. As a dried film is used, the method cannot be really accurate owing to alterations in the size of the cells. Its chief drawback, however, lies in the time required to do a count—namely, about two hours.

Pijper,[14] in 1924, devised an indirect means of measuring the *diameter of cells*. By means of a strong beam of light, which is allowed to pass through a lens of a known focal length and through a dried blood film, coloured rings are produced by diffraction, from which it is possible to calculate the diameter of the cells by measurement. I have tried this method, but was unable to obtain constant results.

Recently Eve[7] has described an instrument which he calls the Halometer. This is intended as a rough guide to the size of the red cells for the use of practitioners. It depends on the same theory as that underlying Pijper's instrument—namely, a thin blood smear acts as a diffraction grating and splits up the rays from a small source of light into a brightly coloured halo. I have used this instrument in a number of cases. I found that dried slides, two or three weeks old, gave too low readings. The blood film must be fresh. In three out of four cases, in all of whom the blood count exceeded 4½ million red cells, and who had been under treatment with liver for several months, the readings on the scale were just within the "pernicious anæmia zone." In one of the cases there was a low normal reading. This instrument certainly should provide the general practitioner with a means of substantiating a suspicion of pernicious anæmia, which could be further reinforced by gastric analysis and examination of the blood. An accurate method of estimating the size of the red cells, and at the same time a method which does not require any length of time, is still required. Lastly, the presence of a *Hunterian glossitis*, although not a constant feature of pernicious anæmia, frequently provides a valuable diagnostic link.

EFFECTS OF TREATMENT ON NERVOUS COMPLICATIONS.

With the advent of liver treatment, and its remarkable effects on the blood picture, it was thought by some and hoped by many that a panacea for all the evils of pernicious anæmia had arrived. As far as the spinal cord symptoms are concerned this has not proved to be the case, except in the opinion of a few. Minot and Murphy[12] treated 31 cases of pernicious anæmia, which showed definite evidence of involvement of the central nervous system. They found that the paræsthesiæ and ataxia were improved, but that the reflexes remained unaltered. Recently developed symptoms of injury to the nervous system usually yielded more rapidly and satisfactorily than those due to old-standing lesions. They further state that no improvement usually takes place until the red cell count has reached four million. Symptoms have not definitely progressed or developed under adequate dietary treatment. Davidson, McCrie, and Gulland[6] found that in the tabetic type of subacute combined degeneration of the cord very marked improvement may occur, but in cases of the spastic type there was no improvement. A few other isolated cases have been reported, in some of which improvement has been noted; in others none. Much the largest series of cases are those described by Ungley and Suzman.[18] They report their observations in 61 cases of subacute combined degeneration of the cord, observed at the Royal Victoria Infirmary, Newcastle, since 1925. The large number of cases is striking, and suggests that pernicious anæmia is a commoner disease in that part of England than in London. Thirty of these cases were treated by liver therapy. Of the 31 cases that had no liver, 28 died within an average period of 4·6 months from the onset of the disease. Of those treated with liver, 17 were improved, eight remained stationary or became worse, and five died. The authors state that the results have been very promising. Numbness and tingling, as a rule, disappear entirely, postural sensibility is re-established more or less completely, and, as a result, incoördination and ataxia diminish or disappear. Further, vibration sense often returns, although in some cases it has remained absent. In three cases the plantar responses became changed from the extensor to the flexor type. Sphincter troubles also were improved. They conclude "that since all evidences of cord involvement may disappear, it is clear that the degenerative changes in the white matter in this disease are not of a permanent character." I have analysed their case reports, especially from the point of view of the degree of anæmia present. In 13 cases they give details of blood counts before and after liver treatment. The average number of red cells in these cases before treatment was 2,300,000. The approximate average after treatment was 5 million. In some of the 12 cases that did not improve on liver there is insufficient data, with regard to the blood counts, from which to draw conclusions. It is obvious, therefore, that the degree of anæmia should be taken into account when considering the possible action of liver treatment on the neurological symptoms as distinct from its effect upon the blood picture.

In my own series of cases the results were not nearly so favourable. Eleven cases have been treated with liver, and adequate doses of dilute hydrochloric acid have been given over periods exceeding six months. Four cases have made slight improvement, three are stationary, and four are worse. None of the four cases that have improved showed definite evidence of pyramidal tract involvement, and their deep reflexes were absent. All four cases in which the condition slowly progressed were of the spastic type. As several of the cases that were not treated by liver could not be traced after leaving the hospital, no comparison is possible between these and the liver-treated cases, but my impression is that life is prolonged in the latter group.

The general effects of liver treatment which have been observed are as follows: 1. An improvement in the blood picture, which, however, in some of the cases has been slow, even though 1 lb. of liver, or its equivalent,

in the form of an extract, has been given daily. 2. The general condition has improved, especially with regard to appetite and digestion. Glossitis, if present, has lessened. 3. Paræsthesiæ become less marked, but their total disappearance, even after months of regular liver treatment, has been rare. 4. No appreciable alteration in the reflexes has been noted, although in one case an extensor response became equivocal. 5. Ataxia has in some cases improved; all of these cases had walking exercises. 6. Mild mental symptoms usually disappear.

The spastic type of subacute combined degeneration of the cord, in whom the degree of anæmia is slight, as a rule slowly progresses despite treatment. Ungley and Suzman's conclusions are, I feel sure, too optimistic. The type of case which shows the best results is that in which the reflexes are diminished or lost and there is no pyramidal tract involvement. Two well-established points in treatment must not be overlooked: (1) eradication of all sepsis, especially dental; (2) the administration of dilute hydrochloric acid in ℥i doses thrice daily. Although liver treatment offers an efficient protection to the blood, it does not act in the same way against the effects of the intestinal toxin on the nervous system. The best method of combating the neurotoxin is to raise the patient's resistance to infection as far as possible by the removal of sources of sepsis, prevention of anæmia by means of liver, and elimination of the toxin originating in the upper intestinal tract by the administration of adequate doses of dilute hydrochloric acid.

Conclusions.

1. The neurotoxin, associated with pernicious anæmia, may attack all parts of the nervous system, cerebrum, spinal cord, and peripheral nerves, although not necessarily simultaneously.

2. In subacute combined degeneration of the cord the peripheral nerves are generally affected, especially in the so-called "tabetic type" of the disease.

3. Pernicious anæmia is a common cause of peripheral neuritis in persons over the age of 35. If the tongue be affected, the diagnosis becomes more probable.

4. Mental changes occur not uncommonly in pernicious anæmia. They range from states of depression, accompanied by loss of mental energy, to definite psychoses. They, like the nervous symptoms, may precede the characteristic changes in the blood by many months. More frequent examination of the gastric contents and of the blood, especially for the presence of megalocytosis, is called for in primary neuroses, and psychoses occurring after the age of 35, in view of the favourable results that may follow adequate treatment, instituted at an early stage.

5. The effects of liver treatment on the neurological symptoms are variable. In cases showing a marked degree of anæmia the improvement may be largely attributed to the favourable effect of such treatment on the blood and general condition. When an extensor response exists this improvement is slight; the progress of the disease may for a time be arrested, but not uncommonly it advances despite adequate treatment.

6. The type of case with abolition of deep reflexes, in which it is suggested that the peripheral sensory neurone largely bears the brunt of the disease, at least in the early stages, is naturally the most favourable.

7. The well-established rules regarding the eradication of dental sepsis and the administration of hydrochloric acid still maintain their importance.

I am much indebted to several of my colleagues at the Hospital for Epilepsy and Paralysis for permission to examine certain of the cases which were under their care.

References.

1. Addison, T.: Collected Works, New Sydenham Soc., 1868.
2. Barrett, A.: Amer. Jour. of Insanity, 1913, lxix., 1063.
3. Buzzard, E. F., and Greenfield, J. G.: Pathology of the Nervous System, London, 1921.

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OBSERVATIONS ON
HARMINE IN THE TREATMENT OF CHRONIC EPIDEMIC ENCEPHALITIS.

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In 1928 Lewin reported the results of his experiments on the pharmacological effects of the plant *Banisteria caapi* and of an alkaloid extracted from it which was termed "banisterine." He found that in laboratory animals and in man banisterine produced stimulation of the central nervous system, followed, especially with larger doses, by depression. As a result of this work the alkaloid was tried in cases of post-encephalitic parkinsonian rigidity and was said to have produced benefit equal or superior to that obtained by administering hyoscine. Beringer (1928) reported excellent results as regards improvement in the rigidity, involuntary movements, and muscular weakness of parkinsonism. He regarded the drug as "a new alkaloid influencing the extrapyramidal nervous system."

Identity of Banisterine and Harmine.

Following Lewin's investigations, Merck stated that banisterine was physically and chemically identical with the better-known alkaloid harmine which is obtained from the plant *Perganum harmala*. Both possessed the formula $C_{13}H_{12}N_{20}$. Lewin was not convinced of the identity of the two alkaloids, but the claim was supported by the fact that *Banisteria caapi* was used in the preparation of *jagé*, an intoxicating drink manufactured by the Indians of Central and South America. Jagé had frequently been examined and the most recent results had left no doubt that the alkaloid it contained was harmine. Bayon isolated an alkaloid from jagé which he named "telepathine," but which was probably harmine. In addition it is significant that harmala seeds are used in the preparation of an intoxicant by natives of North Africa. The identity of banisterine and

(*References continued from previous column.*)

4. Campbell, J. M. H., and Conybeare, J. J.: Guy's Hosp. Rep., 1922, lxxii., 265.
5. Collier, J.: Oxford Medicine, 1921, vi., 358.
6. Davidson, S., McCrie, J. G., and Gulland, G. L.: The Treatment of Pernicious Anæmia, with Liver and Liver Extracts, The Lancet, 1928, i., 847.
7. Eve, F. C.: Brit. Med. Jour., 1929, ii., 48.
8. Ford-Robertson, W. M.: Gastro-intestinal Infection from Oral Sepsis in Mental Disorder, Sect. of Psych., Roy. Soc. Med., May, 1928, Brit. Med. Jour., 1929, i., 956.
9. Hurst, A. F., and Bell, J. R.: The Pathogenesis of Subacute Combined Degeneration of the Spinal Cord with Special Reference to its Connexion with Addison's (Pernicious) Anæmia, Achlorhydria, and Intestinal Infection, Brain, 1922, xlv., 266.
10. Langdon, F. W.: Jour. Amer. Med. Assoc., 1905, xlv., 1635.
11. Minot, G. R., and Murphy, W. P.: Ibid., 1926, lxxxvii., 470.
12. Same authors: Ibid., 1927, lxxxix., 759.
13. Pickett, W.: Amer. Jour. of Ment. Sci., 1904, cxxvii., 1032.
14. Pijper, A.: The Lancet, 1924, ii., 367.
15. Price-Jones, C.: Brit. Med. Jour., 1910, ii., 1418.
16. Same author: The Diameter of the Red Cells in Pernicious Anæmia, Jour. of Path. and Bact., 1922, xxv., 487.
17. Russell, H., Batten, F. E., and Collier, J.: Brain, 1900, xxiii., 39.
18. Ungley, C. C., and Suzman, M. M.: Newcastle Med. Jour., 1929, ix., 67.
19. Warburg, E. J., and Jorgensen, S.: Act. Scand., 1929, lxx., 193.
20. Woltman, H. W.: Amer. Jour. Med. Sci., 1919, clvii., 48.
21. Same author: Arch. Int. Med., 1918, xxi., 791.

harmine appears to have been established conclusively by the recent work of Gunn, in which he shows that the drugs produce similar pharmacological effects in laboratory animals.

The reputed benefit resulting from banisterine in parkinsonism and the suggestion that it was identical with the more easily procurable harmine led to the administration of the latter drug in cases of chronic encephalitis.

Pharmacology of Harmine.

Gunn states that Tappeiner in 1895 was the first to investigate the action of these alkaloids when he gave a general account of the action of harmaline. He described (1) motor stimulation of the central nervous system, with tremors and convulsions, followed or accompanied by paresis; and (2) slowing of the pulse-rate. His experiments with harmine gave similar results. Gunn in 1910–11 came to the conclusion that the actions of harmaline and harmine greatly resembled those of quinine, but that with regard to stimulation of the central nervous system their actions resembled those of some of the other cinchona alkaloids rather than quinine itself. His further work supports these conclusions, and he mentions that Flury obtained very similar results as far as the nervous system and circulation were concerned. Many of the actions of harmine are not relevant to any effect that it may exert in parkinsonism and can be briefly dismissed. It is said to cause relaxation of the intestine and spleen, and to be powerfully toxic to protozoa. It has been used with some apparent benefit in malaria. It produces contraction of the isolated parous uterus of the rabbit and progressive shortening accompanied by gradual lessening of response to stimulation of voluntary muscle (frog's gastrocnemius); the action on all forms of muscle appears to be peripheral.

As regards the central nervous system Gunn states that harmaline does produce slight and transient increase in the excitability of the "spinal reflex" of the frog, and he considers that harmine has a similar action. The main effect, however, is "a paralysis of the spinal reflexes." Gunn found that the chief symptoms produced by harmine in the rabbit were: (1) tremor and swaying of body; (2) impulse to continual movement, especially to "running" movements or "drum-beating" movements of the fore-limbs, followed by general paresis. The tremor was aggravated by voluntary movement. From the use of harmaline in cats Gunn deduced the occurrence of hallucinations, and states that Lewin observed the same result with banisterine in dogs. Of harmine the former observer expresses the opinion that "it is possible that in larger doses it will produce a kind of intoxication in man, seeing that it has been found to produce a pronounced stimulation of the cerebrum in the lower animals."

Harmine in Parkinsonism.

Stern stated in 1928 that he had obtained a few successes in the treatment of parkinsonism with the use of harmine, and the same year Rustige published the results of his experiments with the drug. The latter will be considered in some detail.

Rustige began by giving harmine in doses of 0·005–0·05 g. hypodermically, and later increased these doses in some of the cases; 18 patients received 27 injections in all. In addition, in two cases 0·01 g. was given by the mouth three times a day for several days. All the patients before the experiment showed marked bradykinesia with muscular rigidity.

No effect was noticed on the blood pressure or pulse-rate. In every case, 7 to 15 minutes after the injection of 0·02–0·05 g. harmine, 11 patients complained of giddiness, tinnitus, and a feeling of drunkenness, and, in addition, in one case, of faintness and nausea. The susceptibility of the patients to such symptoms varied greatly. In some the effects increased in severity and duration with an increase of dose. In practically all cases these symptoms disappeared in from 15 to 60 minutes. In one case of post-encephalitic tachypnœa (with a respiratory rate of 80 inspirations per minute), without other signs and symptoms, a diminution in rate to 20–40 per minute occurred 20 minutes after injection and lasted for hours, the breathing being deep and quiet.

A clear objective diminution of muscular rigidity was found in six patients, resulting from the injection of 0·02–0·03 g. harmine. In three of these cases the very pronounced rigidity disappeared entirely, but returned after an interval of 20 minutes. In all six cases it remained somewhat reduced for six hours.

In nine patients an effect was produced on the tremor, but it was variable in nature, and in some cases, if not in all the cases, it was probably the result of suggestion.

The most pronounced effect of the drug, both objectively and subjectively, was upon voluntary movement. In 13 patients (to whom, in all, 16 injections ranging from 0·01 g. to 0·05 g. were administered) a definite improvement in voluntary movement was seen, not only in speed but in vigour, range of movement, and in the ease of performance of rapid alternating movements. This effect was noticed 10 to 22 minutes after injection and had ceased objectively after one hour at the most. Also, the general bradykinesia appeared ameliorated and the patients quicker and freer. The mental state of the patients brightened, and their subjective improvement continued long after all apparent effect of the drug had passed away.

In two cases no effect was produced upon an oculogyric crisis. Harmine given by the mouth exerted no action. No enhancing of the effects of harmine mentioned above was produced by an increase of dose except that the toxic effects of vertigo, &c., were increased in severity and duration. No dose higher than 0·05 g. was given, and the majority received doses varying from 0·02 to 0·03 g.

Only four patients denied receiving benefit, and the author believed that he had avoided the effect of suggestion in other cases.

Personal Cases Treated with Harmine.

We have administered harmine to 38 cases of generalised parkinsonism following encephalitis lethargica. This group was composed of 16 severe, 13 moderately severe, and 9 mild cases. Twenty-two patients were males and 16 females, their ages ranging from 12 to 44 years, with an average of about 26 years. In 19 cases the drug was given by mouth and in 19 hypodermically, the two forms of administration being distributed evenly over the three types of case. The following tables represent the doses and the periods for which they were given in all but two or three cases:—

By Mouth.

0·01 g.	twice	a day	for	seven days
0·02 ,,	,,	,,	,,	five ,,
0·03 ,,	,,	,,	,,	three ,,

Hypodermically.

0·02 g. every morning for seven days.
0·02 ,, three times a day for seven days.
0·04 ,, ,, ,, one day.

All cases prior to the administration had been under treatment with hyoscine given hypodermically. This treatment was stopped in all cases one week before beginning the course of harmine. During this week the condition of all the patients deteriorated greatly so that all except the mildest became very helpless, their ability to walk, talk, dress, and feed themselves being greatly impaired and in many cases completely abolished. Tremor, sialorrhœa, muscular rigidity, bradykinesia, bradyphrenia, and oculo-gyric crises were all much more evident. A few days after the completion of the harmine course, the hyoscine treatment was resumed and all the patients rapidly returned to the state in which they were prior to the omission of hyoscine.

The patients whilst receiving harmine showed no change whatever in their symptoms of parkinsonism at any time during the course. There was no amelioration of the syndrome even for a short period after each dose. Effects on the blood pressure, pulse-rate, muscular rigidity, bradykinesia, and bradyphrenia were particularly sought and none were found. Tremor, involuntary movements, and oculo-gyric crises were unaffected. The only signs or symptoms, subjective or objective, produced by the drug developed in seven patients 30 to 90 minutes after each administration of the highest of the hypodermic doses given—i.e., 0·04 g. In these cases there was a sudden onset of dizziness, generalised headache, usually nausea, and sometimes vomiting. The symptoms lasted about 30 minutes, though the headache occasionally persisted for some hours, and recurred after each dose.

After completion of the course of harmine and resumption of hyoscine hydrobromide gr. 1/100th hypodermically three times daily, nine cases were given, in addition, 0·02 g. of harmine hypodermically three times a day for 14 days with no increased benefit. Two or three cases were kept a little longer than the others on 0·02–0·04 g. harmine hypodermically, three times daily, before the resumption of the hyoscine, but no result other than the toxic effects referred to above was observed.

One case of post-encephalitic respiratory dysrhythmia, in a boy of 13 years free from parkinsonism, was treated with harmine. He was undersized and was suspected of being a mild example of the Lorain type of dyspituitarism, secondary to pituitary or hypothalamic involvement. His respiratory dysrhythmia was of the well-known type in which a deep inspiration is taken and the breath held for 10 to 20 seconds, being then expelled noisily and followed for a variable period by loud tachypnœa before the cycle begins again. In this case the administration of 0·02 g. harmine, three times a day hypodermically, appeared to produce from the start a diminution both in severity and duration of the attacks of apnœa and tachypnœa. Secondarily to this the patient slept better at night. This effect was maintained over a month of treatment with harmine.

Commentary.

The results of our experiments show that harmine administered in the doses given above exerts no perceptible effects, objectively or subjectively, other than the production of vertigo, nausea, and vomiting following the highest doses given hypodermically. These results differ greatly from the findings of Rustige and a few criticisms of his work are indicated.

Rustige's 18 patients received only 27 injections of harmine in all; consequently his conclusions as to the effects were drawn from the results of only one or two injections in each patient. That some of the apparent effects were "functional" and due to suggestion is admitted by the author, and the impression that most of them were probably so produced is gained from a close scrutiny of his paper. The likelihood of their being due mainly to suggestion is increased by the drawing of conclusions from the apparent effects of only one or two doses in each patient. It is remarkable that the reported improvement of parkinsonism was not increased by giving a larger dose of harmine and that the only enhanced effect was an increase in vertigo and nausea. If the amelioration of parkinsonism were a physical effect of harmine it would be expected to have been made more pronounced by increasing the dose. Rustige's findings differ considerably from those of Beringer, although it is now shown that they were using the same drug. Beringer reported no amelioration of the general bradykinesia and no psychical effect from the administration of banisterine. Lastly, it may be pointed out, though tentatively, for Gunn has observed that the actions of harmine vary in different animals, that the reported effects on parkinsonism are somewhat inconsistent with the effects upon laboratory animals. Rustige reports no production of involuntary movements, restlessness, or muscular contraction as immediate effects of the administration of harmine, but describes diminution of rigidity and increased freedom of movement as the first effects evident upon the musculature.

Conclusions.

1. The identity of the alkaloids banisterine and harmine appears conclusive.

2. Harmine in doses up to 0·04 g. given hypodermically has no perceptible objective or subjective effect in ameliorating any of the symptoms presented in the parkinsonian syndrome and is of no value in the treatment of this condition.

3. When given in the above doses harmine produces toxic symptoms of dizziness, headache, nausea, and vomiting in a certain proportion of cases.

4. These toxic symptoms are probably due to the action of harmine on the brain-stem—e.g., stimulation of the vestibular nuclei and vomiting centre.

5. In one reported case, and in one of our cases, the symptoms of severe chronic tachypnœa in a patient free from parkinsonism were partially relieved.

References.

Beringer, K.: Der Nervenarzt, 1928, i., 265.
Flury, F.: Arch. f. Exp. Path. u. Pharm., 1911, lxiv., 105.
Gunn, J. A.: Trans. Roy. Soc. Edin., 1909, xlvii., 245.
Same author: Ibid., 1911, xlviii., 83.
Gunn, and Marshall, D. G.: Proc. Roy. Soc. Edin., 1920, xl., 140.
Gunn: Ibid., 1929, i., 769.
Same author: THE LANCET, 1929, i., 1140.
Hamet, J.: Comp. rend de l'Acad. de Sci., 1927, clxxxiv., 1266.
THE LANCET, 1929, i., 537.
Lewin, L.: Arch. f. Exp. Path. u. Pharm., 1928, cxxix., 133.
Same author: Comp. rend. de l'Acad. de. Sci., 1928, clxxxvi., 469.
Rustige, E.: Deut. Med. Woch., 1929, lv., 613.
Tappeiner, H.: Arch. f. Exp. Path. u. Pharm., 1895, xxxv., 69.

ACTINOTHERAPY.

SOME CLINICAL RESULTS OF TREATMENT.

BY ALBERT EIDINOW, M.B., B.S. LOND.

THE clinical results here described have been based upon records from over 300 cases under my personal care. Some had failed to progress by other methods of treatment, and all were selected, after careful clinical examination, as being likely to respond favourably to light. About 6000 applications of light have been given. Two methods of treatment were adopted: (1) the irradiation of the normal skin of the body—general treatment; (2) application of rays to the site of local lesions—local treatment.

The technique of general treatment has been based upon the principles of "short-ray therapy," which has already been fully described,[1 2 3] and can be summarised as: (1) exposure of an area of skin roughly equal to one-sixth of the surface area of the body; (2) an interval of 10–14 days between irradiations of any given area of skin; (3) irradiation conducted two to three times a week; (4) the application of the minimal erythema dose.

The table classifies the lamps which have been employed and the average dose of rays applied.

In the early cases the sensitiveness of the skin to ultra-violet rays was estimated by means of the "test dose armlet"; the result determined the minimal erythema dose for the type of lamp used for irradiation. In practice it was found that constant and biological dosage could be obtained by careful control of the ampèrage and voltage passing between the electrodes of a lamp. The sensitiveness of the white skin to short ultra-violet rays differs from its sensitiveness to long ultra-violet and visible rays. Thus

many cases of pathological photo-sensitisation show marked hypersusceptibility to exposure to visible rays, but normal reaction to short ultra-violet rays. Children are more resistant to light than adults. The types of skin which are very sensitive to ultra-violet rays are: (1) The "rheumatic or gouty" type, having a dry skin, sweating with difficulty, and a high nitrogen content of blood or urine. The extreme types are seen in some cases of uræmia and nephritis, which are very sensitive to light. In these types erythema is very irritable, painful, and often produces a papular or vesicular rash over the whole body. Improvement is obtained by a course of "sweat-producing baths" and alkaline medicines. (2) The skin over varicose veins of the legs. (3) The type showing vasomotor circulatory disturbances, such as chilblains. This is usually associated with a white, poorly pigmenting skin, sweating, and diminished capillary tone. Marked improvement is seen in these cases after preliminary irradiation.

Table showing Classification of Lamps.

Type of lamp.	Voltage between electrodes.		Ampèrage.		Kilo-watt energy.	Time in minutes for minimal erythema for normal white skin.
	Min.	Max.	Min.	Max.		
Long-flame arc. Iron-cored carbons. 240 D.C.	55	85	25	32	1·375–2·720	3½–5
M.V.L. (atmospheric) 480 volts D.C.	200	250	2·5	5	0·5–1·25	1½–3½
M.V.L. (vacuum) 240 D.C.	105	135	2·0	5	0·21–0·675	2–5
Kromayer type water-cooled M.V.L.	105	180	2·0	7	0·21–1·26	½–2
Throat lamp.	60	120	0·6	2·0	0·036–0·240	2–4
Quartz mercury H.F.E.	—	—	300 ma.	500 ma.	—	3–5

D.C. = Direct current. M.V.L. = Mercury-vapour lamp. H.F.E. = High-frequency electrodes. ma. = milliamèpres.

Hæmobactericidal Power.

The erythema reaction obtained by exposure of the normal skin to rays shorter than 3000 A.U. was correlated in 182 cases with an increase in the bactericidal power of the blood tested in vitro by the "slide cell technique," described by Wright, Colebrook, and Storer.[4] In each case the minimal erythema dose of rays was applied to an area measuring, roughly, 144 sq. in. Samples of defibrinated blood were collected before and two hours after irradiation. The hæmobactericidal power of each sample was determined. The following results were obtained:—

	Per cent.
Cases in which hæmobactericidal power increased after irradiation of skin	153 = 84·5
Cases in which hæmobactericidal power decreased after irradiation of skin	15 = 8·5
Cases in which hæmobactericidal power did not change after irradiation of skin	13 = 7·0

Prof. Greenwood has kindly investigated the results of these observations, and has determined the mean average bactericidal power of the cases treated before and after exposure to light. These results show that 84·5 per cent. of cases tested have increased bactericidal properties of the blood two hours after irradiation, and that the average increase is 6·5 per cent.

Experiments have been carried out[5] which suggest that a local bactericidal effect is produced at the site of irradiation, and carried later by the blood stream into the general circulation. In many cases the bactericidal property of human blood is high, and the increased bactericidal effect after radiation appears comparatively small. The fact that it is improved after irradiation can be accepted as an index of beneficial action. In some cases in which the bactericidal power was abnormally low a marked increase resulted after irradiation. Excessive dosage and over-exposure to light cause a fall in bactericidal power, and harmful results follow, as in chronic pulmonary tuberculosis. Although in laboratory experiments the hæmobactericidal power of animals has been increased by other physical agents, such as heat and mustard plasters, the application of these agents to the human skin is impossible, as the intensity of the burning or blistering necessary is too severe. While the bactericidal test of the blood is an index of the response of the human body to the erythema-producing rays shorter than 3000 A.U., it is no index of the effects of the infra-red, visible, and long ultra-violet rays. When the leucocytic function of the blood is impaired and hæmobactericidal power is low, as in some types of chronic tuberculous disease of the lungs and acute pyrexial microbic infection, dosage and treatment by short ultra-violet rays should be controlled by the study of the bactericidal power of the blood; this makes the method of treatment safe, as an increase in the power can be accepted as evidence of progress.

The series of cases which are described have all received individual treatment and supervision. General treatment was first applied by irradiation with mercury-vapour lamps; at a later stage when slight pigmentation was evident, exposure to two long-flame arc lamps was added to the treatment.

Debility.

Debility accounted for a large proportion of the cases treated. Many of the patients gave a history of previous acute illness—e.g., influenza, colds, and catarrh; in others there was evidence of susceptibility to colds. Although many had no signs of organic disease, the subjective symptoms—i.e., fatigue, weakness, and general malaise, generally demonstrating a subnormal state of health, were the chief reason for treatment. The average number of treatments per case was 13·3. So far as clinical results of treatment can be assessed by personal observations, the general tonic effect of radiation was evident in many patients. They usually said they felt brighter and more energetic, and often that their skins felt warm and glowing and able to withstand cold. Some patients, however, described a feeling of lassitude and drowsiness with an inclination to sleep. Since there are no definite physical signs obtainable to assess the results of treatment, personal subjective observations must be accepted. In cases of severe debility following acute illness the treatment appeared to hasten speedy recovery and return of vigour and health. A low hæmoglobin percentage was obtained in 18 cases, and all these showed an increase of hæmoglobin after 12 treatments. The average percentage before treatment was 66·2 and 82 after 13·9 treatments.

Skin Diseases.

Cases of eczema, acne, alopecia, and early psoriasis have shown the best results. A short course of general exposure by "short ray therapy technique," usually 4–6 treatments, was given before intensive treatment—i.e., a full erythema dose over the lesion every 10–12 days. The erythema persisted for four to five days, and desquamation of the skin occurred after six to eight days. When the skin lesions were diffusely scattered over the whole body, different areas were selected for intensive treatment once or twice a week, but treatment was never reapplied to any given area until all signs of desquamation had disappeared. Ichthyosis showed an excellent response, and cases of complete alopecia of many years' duration improved, four having almost completely recovered after 18 months' progressive treatment.

Tonsillitis and Sinusitis.

General exposure to light by "short ray therapy" improves the general body health and the anæmia

and debility which are associated with subacute inflammatory diseases. Catarrh is lessened and the œdema and congestion of tonsils and pharynx are diminished. Local treatment to the mucous membrane and tonsils is indicated in cases of chronic catarrhal inflammatory conditions with recurrent acute attacks. The treatment has proved beneficial in lessening the susceptibility to colds and acute bronchitis. Treatment is indicated: (1) as a general tonic following the debility and toxæmia associated with septic throats; (2) to improve the general health before tonsillectomy or drainage of maxillary antrum; (3) to heal septic tonsils and discharging sinuses; (4) to diminish the frequency of colds and bronchitis. Local treatment of the pharynx, tonsils, and mucous membrane by the water-cooled throat lamp should only be applied in chronic conditions; in active acute inflammatory conditions it may give rise to a spreading acute cellulitis.

Asthma and Bronchitis.

General treatment has been beneficial and has hastened the healing of cases of active bronchitis. Some cases of bronchial asthma have reported definite improvement. The treatment is of great help during the cold, wet winter months, and assists many patients with chronic emphysema and bronchitis to carry on with their routine work. Cases of debility and bronchitis in young children have responded well.

Lumbago, Arthritis, and Chilblains.

A full erythema reaction over the dorsal lumbar region has in some cases greatly benefited cases of lumbago. Beneficial results have only been obtained in early cases of arthritis. The condition of fibrosis and thickening of synovial membranes with effusion have not shown improvement. The exposure of the hands or feet to intensive radiation has completely cured chilblains by improving the capillary circulation. The continuation of the treatment lessened the incidence of recurrence during the cold weather.

Tuberculous Diseases.

Lupus Vulgaris.—Early cases of lupus vulgaris are healed by general irradiation of the skin. All cases were given general irradiation in addition to periodic local treatment at the site of lesions. Chronic cases in which there was much fibrosis, scarring, and hypertrophy of granulation tissue proved most resistant. Before local treatment, the skin was carefully prepared and cleaned so as to remove dead cells, scales, and scabs. The application of a diathermy needle to isolated fibrous nodules was helpful. In one chronic case a "light sensitisor" (eosin) was injected locally; this caused intense reaction and a slow-healing ulcer. The result was favourable, and the method appears to be indicated in the most resistant types of lupus. If the treatment was continued long enough, in some cases for many months, all cases of lupus completely healed.

Glands.—All cases were treated by general irradiation; local treatment was only applied to discharging sinuses and soft caseous glands. Careful dosage of local irradiation at first caused swelling of the glands, followed by softening and increased discharge, and finally by healing. This inflammatory reaction and increase in size was often seen in the early stages of general treatment, but none of the glands broke down and suppurated. Periadenitis was lessened, and the glands became smaller in size, discretely isolated, and freely mobile. Fibrosis and healing of glands was obtained in all the cases selected, together with marked improvement in the general health with increase of weight, appetite, and general appearance.

Lungs.—The cases selected were chronic, "organised," non-pyrexial types of tuberculous disease. During the early stages of treatment expectoration was increased, and rest in bed after treatment was prescribed if there were symptoms of fatigue or malaise. The patients have improved and have kept well during the past year.

Larynx and Palate.—Tuberculous disease of the palate, tonsils, pharynx, and larynx respond to irradiation favourably. Local treatment is indicated in all cases in which there is no serious lesion of the lungs. Early cases heal with great rapidity. General irradiation of the skin two to three times a week and local treatment of the lesions was applied every 10 to 12 days. Patients were rested for 24 hours after local treatment, as a general reaction sometimes occurred. The technique of treatment with the special throat lamp has already been fully described.[6] The results are very satisfactory, and so far all cases have healed completely, except one case in which there was disseminated tuberculosis of the lungs. Tuberculous disease of the mucous membrane heals with greater rapidity than tuberculous disease of the skin.

Acute Pyrexial Microbic Infections and Granulating Wounds.

Small areas of skin, equivalent to one-twelfth of the surface area of the body—i.e., front of one leg—were exposed daily to a mercury-vapour lamp, and the minimal erythema dose was controlled by tests of the bactericial power of the blood. In all cases tested the initial bactericidal power of the blood was high, and an increase was observed after irradiation. If the hæmobactericidal power had decreased after irradiation treatment would have been discontinued. Lassitude, drowsiness, and sleeping were common after treatment, and in some cases a slight rise in temperature was attributed to the irradiation. Treatment was not applied when the temperature was high. More clinical evidence is necessary before definite conclusions can be recorded.

The improvement of general health by general treatment and local irradiation hastened the repair of granulation tissue and discharging sinuses after surgical operation. The most favourable results were obtained in the treatment of granulating wounds after radical mastoid operations.

Conclusions.

Light ray therapy is a painless method of treatment, which can be carefully controlled during the whole period of illness by cautious technique and correct dosage. Compared to other methods of treatment, such as radical surgical operation, scraping, or curettage, painting with strong acids, caustics and cauterisation, successful results of treatment of some tuberculous diseases by radiation therapy are a wonderful triumph. The treatment needs no anæsthesia, and causes little pain, and patients can often safely continue their normal routine during treatment. The scar tissue which follows healing of ulcers and granulation tissue is soft and freely mobile, and has a characteristic "white tissue-paper" like structure; telangiectic and keloid scars are unknown. The rapid healing of extensive tuberculous and other pyogenic chronic ulceration of the palate and fauces by means of this therapy decisively proves its curative power.

References.

1. Eidinow, A.: THE LANCET, 1925, i., 317.
2. Hill, L., and Eidinow, A.: The Practitioner, August, 1925.
3. Eidinow, A.: THE LANCET, 1926, ii., 645.
4. Wright, A. E., Colebrook, L., and Storer, E. J.: THE LANCET, 1923, i., 365, 417, 473.
5. Eidinow, A.: THE LANCET, 1927, ii., 963.
6. Proc. Roy. Soc. Med., 1929, xxii., No. 4, 523.

HOSPITALS AND ROAD ACCIDENTS.—The Ministry of Health and the Royal Commission on Transport have informed Mr. W. Renshaw, of the Altrincham Provident Dispensary and Hospital, that the position of hospitals in regard to the treatment of cases arising from road accidents "shall be taken into consideration." Mr. Renshaw is asking hospital secretaries all over the country to inform him of the number of such cases treated in 1928, their cost, and the payments made by the patients concerned.

THE IMPORTANCE OF THE LIVER IN CHEMOTHERAPY.*

WITH SPECIAL REFERENCE TO THE TREATMENT OF MALIGNANT DISEASE.

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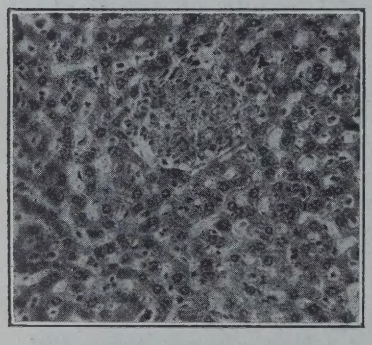
When we come to consider the variety of its functions it is evidently no mere accident or caprice of Nature that the liver is the largest organ of the body. Its portal circulation brings it into intimate relationship with the gastro-intestinal canal and spleen, so any blood changes occurring in these organs must act with particular intensity on the liver. The fact that all the material that enters the blood from the stomach, the small intestines, and the proximal part of the large intestine must pass through the liver before it enters the general circulation, helps to protect the body from toxic substances that may be absorbed from the intestinal canal. Some are converted directly into atoxic material, as when ammonium salts are converted into urea. Others combine with glycocoll, sulphuric acid, or glycuronic acid, and are thereby deprived of poisonous properties. Lastly, alkaloidal and mineral poisons are, to a certain extent, removed from the blood during their passage through the liver, and, as Willcox[1] states, as many others have done, this organ must be regarded as the first line of defence in all cases of generalised poisoning. The importance of the part played by the liver in carbohydrate metabolism, in the contribution of fibrinogen to the blood, in anaphylactic shock, in the secretion of bile, and the absorption of water is well established.

The toxic effect of arsenic on the liver has been the source of great concern to those employing the substance therapeutically. Foulerton[2] was among the first to call attention to the possible harmful effects of the arsenical compounds as essentially identical with poisoning by chloroform, ether, trinitrotoluene, and phosphorus. He experimented with rabbits and found an interstitial hepatitis with injury to the parenchyma cells and, in addition, nephritis. Clinically the toxic effects on the liver tissues and kidney may now be regarded as being among the most common of the ill-effects following the administration of this drug.

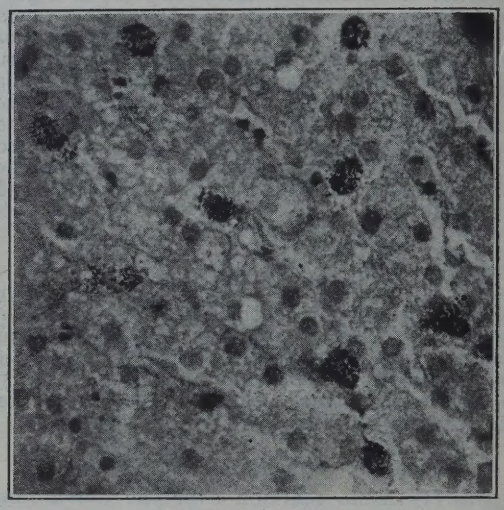
Fig. 1.



Liver from a rat treated with colloidal lead showing focal necrosis. (Microphotograph × 110. Prof. Carter Wood.)

MacCormac and Dodds[3] investigated the liver function of 57 patients in different stages of disease undergoing treatment with novarsenobenzol. In 52 of these the liver function was normal, and in the remainder, as they are careful to point out, any liver damage need not necessarily be due to the arsenic which is used, but may be caused by the syphilis which is being treated. There appears to be abundant evidence that every degree of jaundice and even acute yellow atrophy may occur in syphilis as an accident of this disease, and perhaps, therefore, is in no way connected with the use of an arsenical preparation. On the other hand, arsenic when administered to patients for other conditions than syphilis has been known to cause definite derangement of hepatic function.

Fig. 2.



Liver from a cat treated with colloidal lead showing particles of the metal in the Kupffer cells. (Microphotograph × 500. Prof. W. J. Dilling.)

General anasarca following the ingestion of arsenic was recorded by Bang[4] as long ago as 1774. Geyer[5] reported the occurrence of wholesale poisoning from arsenic at Reichenstein, and mentions the frequent occurrence of serous effusion and ascites. Broadbent[6] made the interesting observation that the serous effusions occasionally seen in Hodgkin's disease might be attributable to the arsenic commonly employed in the treatment of this disorder. Rolleston[7] states that arsenic seems to be capable of setting up cirrhosis of the liver, mentioning in particular the Manchester epidemic in support of this view. O'Leary[8] reported undoubted examples of portal cirrhosis occurring in cases of chronic arsenical poisoning following the therapeutical use of potassium arsenite.

There is little doubt that many of the toxic effects of lead administered intravenously are in part due to liver damage. The varieties of pathological changes produced, especially in the experimental stages of the treatment of malignant disease with lead, have already formed an interesting study.[9]

When we consider the importance of the liver as an eliminator of lead it is not surprising that in industrial poisoning the rôle played by this metal in the production of hepatic lesions assumes considerable proportions. Several types of lesions of precirrhotic or cirrhotic character have been described. Potain[10] reports the occurrence of atrophy of the liver cells, fatty degeneration or infiltration, and intercellular or interlobar cirrhosis, and other observers add that small areas of exudation and hæmorrhage may also be seen.

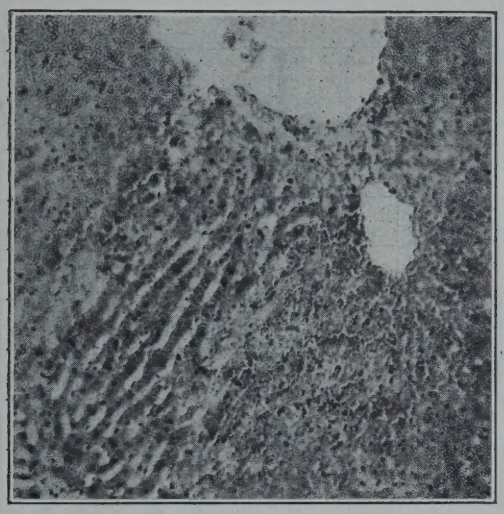
Kussmaul and Maier[11] believe that lead acts directly on the portal vessels, but Hanot and Charpentier[12] think that the hepatic cells themselves are chiefly affected. Meillère[13] states that periportal cirrhosis may be produced experimentally by lead, but Ophuls,[14] who worked with guinea-pigs, failed to observe this lesion.

* This investigation was undertaken on behalf of the Liverpool Medical Research Organisation. Director: Prof. W. Blair Bell, University of Liverpool.

Seeligmüller [15] found evidence of hepatic cirrhosis in the liver of a new-born child of a lead worker, and recovered lead from the organ.

In spite of all the pathological conditions which have been noted in plumbism the consensus of opinion

FIG. 3.



Liver from a rabbit treated with colloidal lead malate showing hæmorrhages into the liver substance. (Microphotograph × 110.)

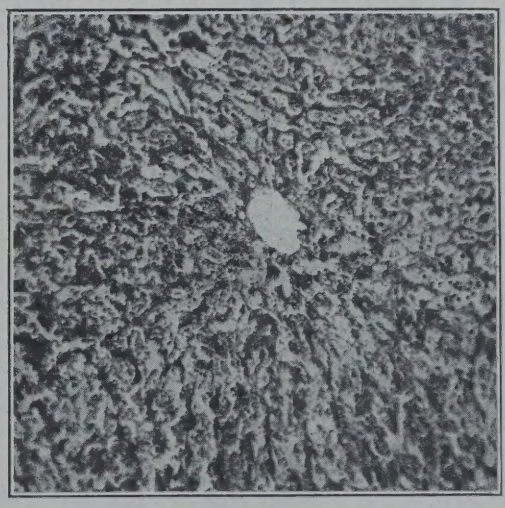
among pathologists who have studied lead poisoning is that post-mortem examination of the liver reveals no changes specific for lead. We ourselves have produced focal necrosis in the liver of rabbits that have received intravenous injections of lead, but no cirrhotic changes have been observed. Carter Wood [16] has demonstrated focal necrosis in the liver of rats by similar means (Fig. 1). Prof. Dilling [17] has shown that shortly after intravenous injections of colloidal lead the liver contains a considerable part of the metal which is distributed throughout the body. This observation is supported by those of other investigators. It must, however, be remembered that the route, frequency, and size of the dosage, and the time elapsing subsequently before the death of the animal, influence the final distribution of lead in the tissues. Dilling both estimated his lead quantitatively and demonstrated it microscopically. He found that the Kupffer cells appeared to contain large quantities of the metal (Fig. 2). This illustration shows the appearances of the Kupffer cells in the liver of a cat after intravenous injections.

The toxic effects of lead on the liver apparently arrange themselves into two groups: first, there is the general toxic or massive dose effect, similar to that which any toxin would produce if introduced into the blood stream, and which has been repeatedly demonstrated by many investigators. This can be produced by lethal doses of any lead preparation and is well illustrated in Fig. 3, which is a microphotograph of the liver of a rabbit treated with a large dose (50 mg.) of colloidal lead malate. Secondly, there is the delayed lead effect which can be produced by most preparations of lead if the dosage be controlled (Fig. 4). There is dilatation of the capillaries compressing the parenchyma cells, a condition which is general throughout the whole liver and is brought about by doses of lead preparations slightly larger than the amount required to produce abortion in pregnant does (a method of which use has been made in regulating the therapeutic doses of the various lead colloids prepared for the Liverpool Medical Research Organisation). If now more lead be given to the animal hæmorrhage will occur and the appearance will be similar to that in Fig. 3 described above. This is probably the explanation of the hæmorrhage mentioned by Legge and Goadby [18] in the livers from cases of lead poisoning.

With smaller doses, as employed in the treatment of patients, cloudy swelling results but rapidly clears up, and the liver is probably normal again in 24 hours. Substances like colloidal lead selenide, colloidal lead phosphate, and colloidal lead hippurate can be administered to rabbits in large doses (30 mg. per kg. of body-weight) without producing any effect other than cloudy swelling commencing around the central vein, the parenchyma cells in the neighbourhood of the portal systems being involved to a lesser extent or not at all. We suggest that if the lead had been administered by the mouth the portal areas might have been the first to degenerate, and would like to point out that in discussing the effect of lead on an organ like the liver, to which the blood arrives from distinct sources, it is essential always to bear in mind the portal of entry. This is so often overlooked by writers on the pathology of industrial lead poisoning and may perhaps be the explanation of the variety of changes described by different investigators. The period over which the lead has acted and the time when the post-mortem was performed should always be stated in drawing conclusions from particular histological appearances. The cloudy swelling may, of course, proceed to actual necrosis of the cells.

The fact that cirrhosis of the liver of the animals was not found is probably due to the fact that insufficient time had been allowed to elapse between the time of injection and that when the animal was killed. It seems quite probable that it would occur in the healing process after degeneration of the cells, but would not arise with the quantities employed during a course of treatment for malignant disease. In the livers examined histologically particles

FIG. 4.



Liver from a rabbit treated with colloidal lead aspartate showing the congested and dilated capillaries compressing the liver cells. (Microphotograph × 140.)

similar to those described by Dilling were constantly found in the liver cells.

Clinical Manifestations.

Just as in the case of arsenic the obvious clinical manifestation of liver involvement in the course of treatment of malignant disease with lead, following the technique of Blair Bell,[19] is jaundice. With the increase of experience with regard to dosage and the interval between each dose we now see very little of this symptom, and it rarely attains any severity. It is very probable that a good many other symptoms.

such as nausea and vomiting may be in part due to liver involvement. Table I., compiled from a series of 216 recent consecutive cases, illustrates the frequency of jaundice during treatment and the extent to which it is dependent on the nature of the preparation used.

TABLE I.

—	Number of consecutive cases observed.	Number developing jaundice.	Percentage developing jaundice.
S_7. Lead suspension (Pb = 0·5 per cent.)	172	19	11
L.S. Lead selenide (Pb = 0·2 per cent.)	19	2	10
H_8. Lead phosphate (Pb = 0·4 per cent.)	25	0	0

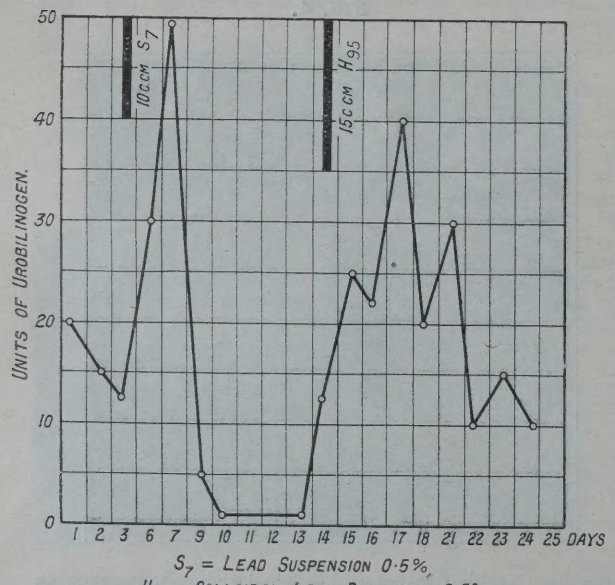
Tanquerel des Planches [20] in 1839 drew attention to two kinds of jaundice occurring in lead poisoning. He distinguishes "jaunisse suite des doleurs de colique" from "l'ictère saturnine, résultat de l'altération du sang par le plomb." The former he states to be due to extravasation of bile from its usual reservoir, and the other to a direct change of the blood by lead. This observation was amazingly accurate, and with our present knowledge of the reticulo-endothelial system is easy to explain.

In the early days of experimental lead therapy when larger doses were used three distinct types of jaundice presented themselves.

(1) A pure hæmolytic jaundice due to destruction of red blood-cells by lead and characterised by a fine icteric tinge, an indirect van den Bergh reaction, and excess of urobilinogen, but with no bile pigments in the urine.

(2) A type in which jaundice was deeper and in which a variety of van den Bergh reactions, including the biphasic,

FIG. 5.



The effect of intravenous colloidal lead phosphate on the output of urobilinogen.

were obtained and along with which were found excess of urobilinogen and bile pigments in the urine. This type must have been associated with definite damage to the liver parenchyma.

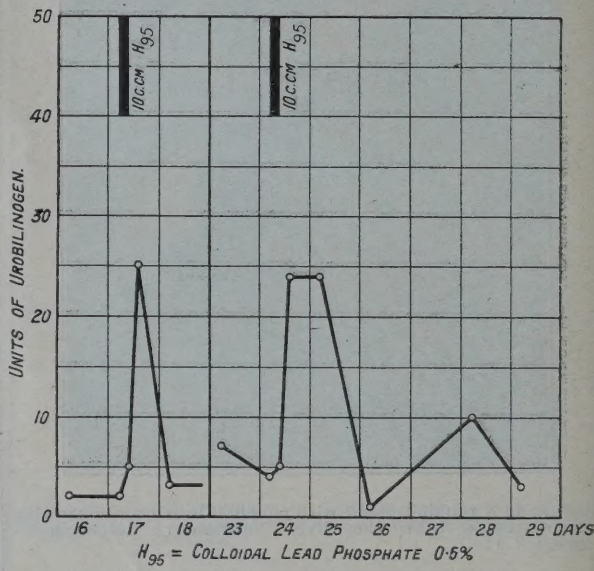
(3) A frankly obstructive jaundice where in addition to the changes in type (2) there must have been a cholangitis leading to obstruction of the smaller bile-ducts. In this type the jaundice is deep, bile pigments are present in the urine in large quantities, and the van den Bergh reaction is of the immediate direct type.

The majority of cases developing jaundice was apparently of the hæmolytic type and transient in nature, but the following case illustrates the rapid production of obstructive jaundice following a massive dose of lead suspension.

CASE N. H. 17.—Male, aged 24. Diagnosis, radiographic and histological, sarcoma of the femur.

Initial investigation revealed absence of anæmia and normal renal function. A massive dose of lead suspension

FIG. 6.



The effect of intravenous colloidal lead phosphate on the output of urobilinogen.

(40 c.cm. of 0·5 per cent.) was administered intravenously at midday on Dec. 18th, 1924. The patient had a rigor lasting ten minutes at 6.30 P.M. and vomited three times. There was no diarrhœa. The following day there was marked diminution in the secretion of urine; hæmaturia, jaundice, and vomiting continued. On Dec. 22nd there was still oligurea, only 64 c.cm. of urine being secreted in 24 hours. The jaundice was deeper, there was bile in the urine, and the serum gave a positive direct van den Bergh reaction. By this time the blood-urea had risen from 23 mg. to 167 mg. per 100 c.cm. and the hæmoglobin had dropped from 98 per cent. before treatment to 38 per cent. after. On the following day the jaundice was less deep but persisted in some degree until the patient's death on Jan. 1st, 1925.

Output of Urobilinogen.

The consensus of opinion is that bacteria in the intestine convert bilirubin into urobilinogen. Most of this is excreted by the gut, but some is carried to the liver by the portal system and so reaches the liver parenchyma. The absorbed portion is largely reconverted by means of the liver cells and re-excreted with the bile: a small portion remains unchanged and is excreted in the urine. This conversion by the liver of most of the urobilinogen into bilirubin is important, in that many observers regard excess of urobilinogen in the urine as evidence of a damaged liver which is unable to bring about the conversion. MacCormac and Dodds [3] conclude that if there be any damage to the liver cells this property of converting urobilinogen into bile pigment is lost and, therefore, urobilinogen accumulates in the blood and is excreted in excess in the urine.

Uvedale Owen [21] has drawn attention to a fact which had escaped the attention of some observers—namely, that the output of urobilinogen varies from hour to hour and from day to day in the same individual. We have been able to confirm this observation and further to note that such factors as ketosis and intestinal stasis tend to increase the output of urobilinogen in the urine. Bearing these limitations in mind we have found the output of urobilinogen in the urine to be a valuable guide to the probable extent of liver damage, the result of lead therapy.

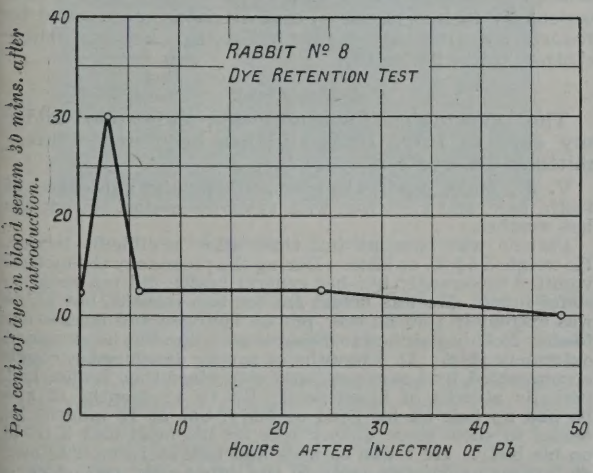
Indeed, we have considered a high urobilinogen content of the urine as the result of lead therapy to be a contra-indication to further dosage until more normal values have been obtained.

The quantitative test we have used is a modification of that of Wallace and Diamond [22] who used Ehrlich's aldehyde reagent which produces a red colour with urobilinogen. The effect of lead therapy on the output of urobilinogen is shown in the following two charts of patients who are undergoing treatment (Figs. 5 and 6). Each morning the amount of urobilinogen in the urine is estimated and in some cases each specimen that is passed for 24 hours or 48 hours as in Fig. 6. The immediate rise corresponds closely with the period of maximum dye retention in rabbits following injections of lead which will be described later. Occasionally no rise in the urobilinogen output occurs, and it is these cases which show but little tendency to develop toxic manifestations.

Dye Retention.

The dye-retention test was devised by Rowntree, Hurwitz, and Bloomfield,[23] who noted that phenoltetrachlorphthalein, when injected subcutaneously, escaped from the body exclusively via the biliary passages. By careful animal experiments the originators of this test were able to prove that the excretion of the drug diminished in proportion to the amount of liver tissue damage. Since this work various improvements have been suggested both in the method of administration, nature, and dose of the dye. Graham and Cole [24] inject 40 mg. of phenoltetraiodophthalein per kg. of body-weight intravenously, thereby taxing the liver to its utmost with a relatively toxic but brilliant dye, estimating the amount of dye left in the blood after half an hour. They have found that by using this amount it is possible

FIG. 7.



The effect of intravenous lead suspension on dye retention in a rabbit.

to estimate smaller variations in extent of liver damage than can be found by using the lesser quantities of phenoltetrachlorphthalein and bromsulphthalein.

In our experiments we have used both the bromsulphthalein as recommended by Bulmer[25] and more recently phenoltetraiodophthalein, adopting the method of Graham and Cole and following their technique in every detail. Our experiments were divided into two groups: in one group the dye retention in rabbits following lead (S_7) injections was determined, and in the other group the effect of lead on the dye retention was estimated in patients undergoing treatment with this drug.

Table II. and Fig. 7 illustrate the effect of lead in the form of S_7 which is a suspension containing 0·5 per cent. of lead, on the dye retention of rabbits.

It will be noticed that the highest rise occurs about three hours after the injection, but that a rise is frequently observed also on the day following injection and that this tends to return to normal after two or three days. In the case of patients undergoing treatment with lead—that is, with rela-

TABLE II.

Date.	Rabbit.	Amount of Pb.	Dye per cent. after half-hour.	Time after Pb.
24/2/29	No. 7,* Chinchilla, 2750 g.	—	10	Before Pb.
25/2/29	—	10 c.cm. S_7	25	3 hours
25/2/29	—	—	10	6 ,,
26/2/29	—	—	20	24 ,,
24/2/29	No. 8, English, 2250 g.	—	12·5	Before Pb.
25/2/29	—	10 c.cm. S_7	30	3 hours
25/2/29	—	—	15	6 ,,
26/2/29	—	—	12·5	24 ,,
27/2/29	—	—	10	48 ,,
7/3/29	—	—	5	10 days
8/3/29	—	5 c.cm. S_7	35	4 hours
15/3/29	—	—	10	7 days
20/11/28	No. 5, 2350 g.	—	3	Before Pb.
21/11/28	—	10 c.cm. S_7	—	—
22/11/28	—	—	10	24 hours
23/11/28	—	—	3	48 ,,
28/11/28	—	—	4	7 days
28/11/28	—	10 c.cm. S_7	—	—
29/11/28	—	—	12·5	24 hours
30/11/28	—	—	3	48 ,,
20/11/28	No. 6, 2000 g.	—	0	Before Pb.
21/11/28	—	10 c.cm. S_7	4	24 hours
28/11/28	—	—	2·5	7 days
28/11/28	—	10 c.cm. S_7	—	—
29/11/28	—	—	10	24 hours

* No positive van den Bergh reactions were ever obtained. This rabbit was very ill 24 hours after the lead administration and had to be killed. Histological examination of the liver showed definite liver damage. This will account for the increased dye retention when the test was carried out before the animal was killed.

tively smaller doses than were given to the rabbits—no difference was observed in the dye retention either in the case of bromsulphthalein or phenoltetraiodophthalein.

Lævulose Tolerance.

The lævulose tolerance test as described by Spence and Brett [26] has been of no value to us in determining the extent of liver damage the result of lead therapy. It has, however, been useful in determining the suitability of cases for treatment with this drug in the initial investigation of the patient. One of the causes of its failure is the fact that nausea and vomiting, which the ingestion of large quantities of lævulose may produce, militate against the success of this procedure and these are of necessity a frequent accompaniment of a damaged liver.

Conclusions.

The conclusion we have come to in the observation of the toxic effects of the injection of colloidal lead is that a careful study of the existing damage to the liver in the course of treatment, so far as this is possible, is of importance in the determination of the extent and interval of dosage. A careful examination of the liver function is of great importance also in the initial selection of cases, for we cannot hope to treat a case successfully with lead where the liver function is even moderately impaired.

References.

1. Willcox, W. H.: Brit. Med. Jour., 1919, i., 605.
2. Foulerton, A. G. R.: Ibid., 1920, i., 864.
3. MacCormac, H., and Dodds, E. C.: Ibid., 1923, ii., 1200.
4. Bang, F. L.: Soc. Med. Harv. Collect., 1774, i., 307.
5. Geyer, L.: Arch. f. Derm. u. Syph., 1898, xliii., 221.
6. Broadbent, W.: Brit. Med. Jour., 1903, i., 1140.

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CONGENITAL ECTODERMAL DEFECT.

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IN 1920 Goeckerman [1] reported a case of a patient who presented more or less aplasia of most of the cutaneous ectoderm. He discussed six similar cases in the literature and considered they formed a distinct and easily recognisable type. He applied to them the term high grade or major ectodermal defect.

MacKee and Andrews [2] described a similar case. After a consideration of the literature they came to the conclusion that various grades of congenital aplasia of the skin, nails, hair, and teeth, and even of the subcutaneous and sweat glands, alone or in combination, are of fairly frequent occurrence, but that it is much more uncommon to meet with patients presenting congenital anomalies, ranging from deformation to complete absence of all the cutaneous structures originating from the epidermis. Goeckerman, in the discussion on this paper, referred to a further case seen by him, and stated that Jhadani, of India, had seen many of these cases as a hereditary, generally sex-linked, anomaly transmitted through the mother. Goeckerman's own case was in a female though all the other recorded cases were in males.

MacKay and Davidson [3] record a family, which they include under this group, showing a minor degree of ectodermal defect without involvement of the teeth, sweat or sebaceous glands. In this family the condition had shown itself in five generations and occurred in both males and females. As is usual with hereditary conditions in several of the cases no history of a familial incidence could be obtained. Jean Smith,[4] under the term abnormal dentition, showed a case in a male child of 5 years of age, markedly under weight, with dental aplasia, hypotrichosis, absence of sweating, and a history of a previous admission to hospital when 3 months of age with a temperature of 107·8° F. which rapidly fell and for which no cause could be detected, which apparently belongs to this group.

[1] Arch. Dermat. and Syph., 1920, i., 396.
[2] Ibid., 1924, x. 673.
[3] Brit. Jour. Dermat. and Syph., 1929, xli., 4.
[4] Proc. Roy. Soc. Med., 1929, xxii., 648.

DRS. CUNNINGHAM AND DATNOW: REFERENCES.

(Continued from previous page.)

7. Rolleston, H. D.: Diseases of the Liver, Gall-bladder, and Bile-ducts, London, 1914, p. 184.
8. O'Leary, P. A., et al.,: Jour. Amer. Med. Assoc., 1928, xc., 23.
9. Bell, W. Blair, Williams, W. R., and Cunningham, L.: THE LANCET, 1925, ii., 793.
10. Potain: Quoted by Meillère, G.: Le Saturnisme, Paris, 1903, p. 176.
11. Kussmaul, A., and Maier, R.: Deut. Arch. f. Klin. Med., 1872, ix., 283.
12. Hanot and Charpentier: Quoted by Meillère: Le Saturnisme, Paris, 1903, p. 177.
13. Meillère, G.: Compt. rend. Soc. de biol., 1902, liv., 1134.
14. Ophuls, W.: Amer. Jour. Med. Sci., 1915, cl., 518.
15. Seeligmüller, A.: Deut. Med. Woch., 1902, xxviii., 317.
16. Wood, F. Carter: Jour. Amer. Med. Assoc., 1926, lxxxvii., 717.
17. Dilling, W. J.: Jour. Path. and Bact., 1929, xxxii. (*In the press*)
18. Legge, T. M., and Goadby, K. W.: Lead Poisoning and Absorption, London, 1912.
19. Bell, W. Blair, Woolfenden, H. F., Williams, W. R., Cunningham, L., and Herd, S. B.: THE LANCET, 1926, i., 537.
20. Tanquerel des Planches, L.: Traité des maladies de plomb ou saturnines, Paris, 1839.
21. Owen, D. U.: Ann. Trop. Med. and Parasit., 1928, xxii., 469.
22. Wallace, G. B., and Diamond, J. S.: Arch. Int. Med., 1925, xxxv., 698.
23. Rowntree, L. G., Hurwitz, S. H., and Bloomfield, A. L.: Johns Hopkins Hosp. Bull., 1913, xxiv., 327.
24. Graham, E. A., et al.: Jour. Amer. Med. Assoc., 1926, lxxxvi., 467.
25. Bulmer, E.: Quart. Jour. Med., 1927, xxv., 101.
26. Spence, J. C., and Brett, P. C.: THE LANCET, 1921, ii., 1362.

The main clinical characters described by MacKee and Andrews are as follows:—

1. A dry, white, smooth, thin, pliable, and glossy skin. In their own case there were numerous fine wrinkles at the corners of the eyes and on the cheeks near the nose.

2. Absence of sweat glands. None of the recorded cases had ever shown sensible perspiration, and histological examination which had been carried out in the majority of the cases failed to show sweat glands or anlage.

3. Dental aplasia to a pronounced degree was found in all the recorded cases. The case described by MacKee and Andrews had five teeth, the largest number recorded, including one in the lower jaw which is unusual as in all the other cases the lower teeth were absent.

4. Hypotrichosis. Congenital hypotrichosis is common to all the cases, the hairy parts being involved in various degrees. Tanugo hair is absent from most of the body surface.

5. The lips are thick, muscular, and everted, presumably the result of the additional labial activity required for mastication without teeth.

6. Depressed nasal bridge and chronic atrophic rhinitis. A depressed nasal bridge and prominent frontal bosses were present in all the recorded cases. In the great majority there was a chronic atrophic rhinitis.

The case described below is peculiar in that the bridge of the nose is not depressed.

7. In several cases the nails were deformed.

8. Papular lesions of the face are recorded in a considerable proportion of the cases.

9. Inferior mentality has been recorded in several of the cases, in others the mentality has been normal or somewhat above normal.

10. Patients are handicapped through inability to radiate sufficient heat under certain environmental conditions, but they are healthy and active and longevity is apparently unaffected.

In Tendlan's case [5] the mammæ were absent.

Subjective Symptoms.—The main subjective complaint which is common to all patients is discomfort in hot weather. They find it necessary to avoid heat, vigorous physical exercise, hot food and drink, especially in hot weather, and often are compelled to resort to artificial perspiration by keeping their clothes wet with water.

A New Case.

The following case was admitted to hospital under my care in July, 1924, and has been under intermittent observation ever since:—

V. J., male, aged 6½ years. Complaint: absence of teeth, hair, and sweating, with great discomfort during the hot weather.

Patient was born at full time after a difficult labour. He weighed 5½ lb. at birth. During the pregnancy the mother vomited incessantly but her general health did not seem to suffer much. He was breast fed for two months, but as he was extremely thin he was put on lactogen and later other foods. Nothing seemed to disagree with him but he remained extremely thin. At 9 months of age he developed a cough accompanied by hoarseness, and ever since then he has had periodic attacks of hoarseness. Up to 18 months of age he had no hair on his head or body, but at 18 months he began to show some downy hair on his head and a little on his body. He began to walk and talk at 18 months and at 2 years he cut two teeth in the upper gum, one on each side for back. An X ray taken at this time was said to have shown no evidence of further teeth. He had had various forms of ductless gland treatment, chiefly thyroid, but his mother always stopped them as they caused mental excitement. He was born and lived in Zululand, and ever since birth he had been very uncomfortable in hot weather and had never been seen to sweat. He managed to get through the hot weather by the use of frequent cold baths and keeping his hands and feet in cold water. Apart from the discomfort during the hot weather and the periodic attacks of hoarseness he had been well.

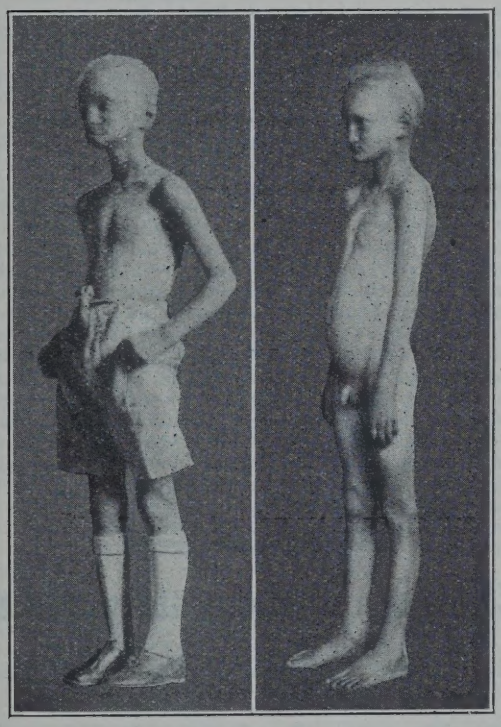
Family History.—There are two other children—4 and 6 years older than the patient. There have been no miscarriages. They are both perfectly well-developed and normal children. The mother is a well-developed woman. The father is rather small and thin. Recently (1929) he is reported to have developed tabes dorsalis. There is no known similar case on either side of the family.

On admission to hospital (June 9th, 1924) the boy's appearance (Fig. 1) simulated very closely a

[5] Virchow's Arch. f. path. Anat., 1902, clxvii., 465.

diminutive old man. He had a large globular head very scantily covered with an almost colourless down from 1 to 1½ inches long. There were numerous prominent veins all over his head. There was a complete absence of eyebrows; the eyelashes were present in moderate amount, but as they were almost colourless, they were not seen at first glance. Over the upper part of the face were a few scattered cream-coloured papules, the largest about the size of a large pin. Running horizontally backwards from the outer canthus were numerous fine wrinkles, and similar wrinkles were present from the inner

FIG. 1. FIG. 2.



Patient, aged 6½ years. Aged 7¼ years.

canthus running down the cheek and at the angles of the mouth. The nose was straight and not depressed. The lips were relatively thick and everted. The lower jaw was very poorly developed. The alveolar margin was thin and sharp, not much thicker than the blade of a knife. There were two teeth, one on each side of the upper jaw for back. An X ray shows no evidence of further teeth.

The whole lower half of the face was tiny compared with the upper half. The body was extremely thin; there was a complete absence of breasts and the nipples were represented only by a minute pigmented spot. The whole skin was dry but not harsh except on the palms of the hands, where the skin was thick, cracked, hard, and dirty. There was on the limbs a very scanty, very fine down-like hair. The genitals are underdeveloped, the testicles being about the size of small cherry stones.

Radiological Appearances.—X ray of the skull showed a normal sella turcica. The bones of the vault of the skull were very thin. X ray of the limbs showed ossification normal for his years. There was no cardiac enlargement.

The blood pressure was 100/62. The urine showed no albumin or other abnormal constituents. There was a distinct polyuria varying from 50–80 oz. per day. The urea-concentration test at the second hour showed 2·45 per cent. The two-hour test showed a variation of 16 in the specific gravity and no increase of nocturnal urine. The blood-urea was 30 mg. per 100 c.cm., creatine 1·75 mg., uric acid 2·3. A blood-sugar curve was normal. The basal metabolic rate was on first admission estimated at +15 per cent., a year later at −6 per cent.

Dr. J. Luckhoff, in charge of the nose and throat department, reported:—

"The upper jaw though with an ill-developed alveolar margin is shallow but very broad, consequently the nasal spaces are quite abnormally wide, the turbinate bodies are relatively small, and the mucous membrane dry with a secretion of yellow tenaceous muco-pus—a pathological condition clinically (though not typical) very similar to the disease we term atrophic rhinitis. Relative to the size of his nasal spaces his maxillary sinuses are not large, his frontal sinuses are very small. Larynx shows a typical laryngitis sicca secondary to the nose condition. Mastoid processes both in surface bulge and in length are abnormally developed with a deep sulcus between them and the meatus on each side. The skull bones seem thin."

The Wassermann reaction was negative. Mentally the boy was bright and, possibly because he had never been to school on account of his peculiar appearance, precocious. In 1929 his appearance had improved and he is now attending school and doing quite well. His mother states that he has already had several articles or children's stories published in the newspapers.

Pilocarpine up to one-sixth of a grain, followed by a hot pack, produced no visible perspiration.

Readmission.—The patient was readmitted again for examination in April, 1925. His appearance had distinctly improved and he looked decidedly younger (Fig. 2). There was an increased growth of hair on the head and there was definite evidence of eyebrows. He was still very uncomfortable in hot weather, but thinks he sweats a little now. After pilocarpine, gr. ⅛, although no visible sweat was apparent, on palpation there did appear to be some moisture on the skin. The physical examination was as on previous examination except that the knee-joints were rather more prominent. There was no pain but there seemed to be slight effusion in both joints. The testicles did not appear to have developed much.

There was much difficulty in getting permission to excise a portion of skin for examination, but since the patient had a small wart on the thenar eminence of one hand, this was removed with a portion of the surrounding skin. Prof. B. J. Ryrie reports on it as follows:—

"The sections show a papilloma with 0·5 to 0·75 cm. of the surrounding skin on either side of it. The line of excision is sufficiently deep to bring all layers of the skin and part of the subcutaneous fatty areolar tissue under examination. The epidermis shows well-marked differentiation into the various layers. Stratum granulosum is very marked and there is a high degree of keratinisation. Corium and subcutaneous tissue appear normal and the fine muscular fibres are well developed. Epithelial skin appendages are entirely absent, there being no hairs, no sebaceous glands, and no sweat glands."

The patient was seen again in June, 1929, although there was no opportunity to overhaul him. He had still further improved; the hair on his head had grown still more, and his mother considered him much better.

Discussion.

Except for the fact that the bridge of the nose is not depressed and that the sexual development is backward the case corresponds exactly with those described by Goeckerman and MacKee and Andrews. With regard to the ætiology there seems no doubt that the condition is a true hereditary developmental defect frequently familial, the arrest of development occurring very early in intra-uterine life. Although the present case is, in view of the father's tabes, possibly a congenital syphilitic, there is no evidence in the other cases that syphilis plays any part in the ætiology.

A further interesting and practical point is the similarity in appearance, at any rate, in the early stages of some of these cases, to the clinical picture described by Hastings Gilford as progeria. Although this was not remarked upon in any of the cases

collected by MacKee and Andrews, the appearance of the present case when first seen in 1924 closely resembled the photograph of Hastings Gilford's Case 1 at 15 years of age and also his reproduction of Variot's case.[6] There was the same leanness, the same absence of hair, the wrinkling of the skin of face about the eyes and nose, the general dryness of the skin, the thin skull with visible veins coursing over it, the relative smallness and shortness of the lower part of the face accentuated by the ill-development of the alveolar portions of the jaw, and the absence of teeth. There was also the backwardness of sexual development. It is true that the lips were thick, but this could reasonably be accounted for as the result of muscular hypertrophy on account of the complete absence of teeth. The nose was thin and short. A diagnosis of progeria had actually been made.

In the discussion on Dr. Jean Smith's case shown at the Section for the Study of Disease in Children of the Royal Society of Medicine under the term abnormal dentition, Dr. Kingston Barton remarked on the facial resemblance to progeria, and Dr. Jean Smith stated that progeria had been at first suggested as the diagnosis but had apparently been ruled out on account of absence of cardiovascular changes and the lack of a dry withered skin.

Resemblance to Progeria.

It is of interest also that Gilford's Case 2 was first described by Hutchinson when 3½ years old as "congenital absence of hair and mammary glands with atrophic condition of the skin and its appendages in a boy whose mother had been almost wholly bald from alopecia areata from the age of 6." Hutchinson further described the nails as thin and curved backwards so as to present more or less of a hollow in the middle. Although Hutchinson described the teeth at the age of 3½ as all cut and tolerably regular, Dr. Jago, in describing the condition at the age of 14, stated "the teeth are abnormal in number, none are decayed, nor have any been lost or extracted. The canines, bicuspids, and incisors are normal but somewhat irregular, but there are no molars."

In Gilford's Case 1 the mammary glands also were absent, and unusually small nipples were present. The nails were very short, flat, ill-shaped, and membranous. The teeth were few in number, crowded, and erratic in situation and variable in size. The skin was soft and pliable and usually dry, although Gilford was able to detect sweat twice in hot weather. Gilford in 1911 looked upon progreria as a premature senile decay affecting the body as a whole, arising in an individual in a state of infantilism. He did not consider the evidence sufficient at that time to implicate the pituitary. He did, however, differentiate the senile appearance frequently presented at a somewhat later age by ateliotic dwarfs from true progeria.

Simmonds [7] described in adult women following embolic destruction of the anterior lobe of the pituitary the onset of cachexia, greying of the hair, loss of the axillary and pubic hair, wrinkling of the skin, loss of teeth, and a general appearance of premature senility. Later he reported [8] the case of a dwarf, 110 cm. in height, who died at the age of 21. At autopsy the posterior lobe of the pituitary was normal, but there was almost complete destruction of the anterior lobe with replacement by cysts which Simmonds considered the result of an embolism. It is noteworthy that, although he had already described moderate grades of apparent premature senilism in adults the result of embolic destruction of the anterior lobe, he makes no mention of its presence in this case.

Harvey Cushing [9] definitely accepts progeria as a pituitary syndrome. He publishes a remarkable photograph of a female, aged 8, as an example of the Hutchinson-Gilford syndrome of progeria. It differs, however, very strikingly from the Hutchinson-Gilford cases in the fact that she possesses well-developed eyebrows and an excellent head of coarse black hair. The shape of the lower part of the face is also quite different from the ill-developed lower jaw of progeria. The whole appearance of the case is much more suggestive of Gilford's ateliotic dwarfs with consecutive senilism which he definitely differentiated from progeria. Examples of this correlation he figures on pages 663 and 603 of his book.

It seems clear that anterior lobe deficiency commencing at an early age may lead to various degrees of dwarfing with infantilism and a more or less striking appearance of premature ageing, but these cases differ materially in appearance from the cases described by Hastings Gilford as progeria. In these cases an essential feature seems to be a more or less extensive ectodermal defect which in itself gives a peculiar aged appearance to the individual. In Gilford's Case 1, as in the present case, the nipples were completely absent, and this must have originated in an early stage of intra-uterine development. In other cases a similar ectodermal defect occurs as a hereditary anomaly without progressing to the visceral and vascular changes accompanying the full-blown picture of Gilford's progeria. Clinically in their early stages some of these cases simulate to a remarkable extent the appearance of Gilford's cases.

Should such a patient become affected with a chronic nephritis, to which he might be considered unduly liable on account of the frequency of chronic septic infections of the nose and the increased strain on the kidney from the defective sweat apparatus, his condition would certainly be indistinguishable from one of progeria. It might be suggested that the ectodermal defect in progeria included the pituitary; but of this there is no proof, and in both Gilford's cases at autopsy the pituitary, although not examined with the care that would now be devoted to it, was stated to be normal macroscopically both in size and appearance.

[6] Disorders of Postnatal Growths and Development, 1911.
[7] Deutsche Med. Woch., 1918, xxxi., 852.
[8] Ibid., 1919, xviii., 487.
[9] Brit. Med. Jour., 1927, ii., 1.

Clinical and Laboratory Notes.

PROGNOSIS IN MALIGNANT MELANOMA.

A REPORT ON FORTY CONSECUTIVE CASES.

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DURING the 15 years 1910–24, 40 cases of malignant melanoma were examined in the pathological department of Leeds University, 22 arising in skin or mucous membrane and 18 in the eye. Thirty-six of these came from the Leeds General Infirmary, one from the East Leeds War Hospital, one from the Women's Hospital, and two from private sources.

Incidence of the Disease.—The in-patient admissions at the infirmary during this period were 136,609 and 36 cases of malignant melanoma were reported. However, as some of these patients were treated in the out-patient department the incidence is even less than the figures shown.

Age and Sex Incidence.—Of the eye cases there were 13 males and five females, the average age being 58·4 years. Of the skin cases there were seven males and 15 females, the average age being 56·3 years. The youngest patient was aged 27, the oldest 82. These figures may be compared with those of Broders and MacCarty (1916), who found an average age of 49 in a series of 70 cases. The Leeds figures suggest that the age incidence for eye and skin cases is the same.

Subsequent History of Cases.

1. *Eye Cases.*—Of the 18 eye cases, 15 have been traced. Five are alive and well after periods ranging

from 5 to 19 years. Three died within one year of operation, three within two years, and one each at seven, eight, and nine years. The cause of death could not be ascertained with certainty in all the cases, but several of the histories suggest the presence of secondary deposits. In the following three cases the presence of metastases was confirmed post mortem.

1. A man, aged 50, after having failing vision for two and a half years, was admitted for detachment of the retina with tumour. The eye was removed by Mr. A. L. Whitehead. Nine years later he was admitted under Lord Moynihan for intestinal obstruction, due to a large melanotic growth involving the sacrum and rectum. At autopsy the liver was found to contain a few tertiary deposits.

2. A man, aged 67, had had six weeks' history of eye trouble previous to removal of the eye (Mr. Whitehead). Thirteen months later, at autopsy, secondary deposits were found in liver, lungs, and pancreas.

3. A third man had a blind eye for 11 years. He first attended the infirmary for symptoms of malignant disease of the liver (Dr. Wardrop Griffith). Post mortem extensive deposits of malignant melanoma were found in the liver and peritoneum, and a primary tumour in the eye.

These cases illustrate the varying malignancy of the growth, and the last the remarkable latency which has been observed so often. Cairns (1923) reports a melanoma of the scapula secondary to a tumour of the eye removed 18 years previously.

2. *Melanoma of Skin and Mucous Membranes.*—The sites of origin were as follows. Eyelid 1, cheek 2, parotid region 1, neck 1, trunk 6, thumb 2, forearm 1, buttock 1, instep 1, great toe 2, anal canal 1, vulva 1, gum 1. In one case the tumour was found in a gland of the groin, and no primary was ever discovered. A history of pre-existing pigmented moles is recorded in eight cases. Of 20 cases traced, two remain without recurrence after five and seven years respectively. Of the 18 who died, 12 are considered to have had metastases. In two this was confirmed at autopsy; in the rest, either the growth was incompletely removed at operation, or enlarged glands, ascites, &c., were observed before death. There was one instance of multiple secondary deposits in the skin. In two others the presence of secondary deposits at death is probable.

One of these patients had a growth of the great toe and enlarged glands of groin removed by Mr. Littlewood. Both primary and secondary showed microscopically a melanotic growth of epithelial type. He remained well for ten years, and then returned for examination, when he was found to have malignant disease in the groin glands and in the liver. There was no indication of a primary source other than the original tumour. The latency of malignant melanoma is apparently not confined to tumours arising in the eye.

Of the 18 patients, 7 died within one year of the first operation, 3 within two years, 4 within three, 2 within four, and 1 each at six and ten years. Trauma was noted in the case reports in four cases. (1) "A fall of coal caused a mole on the cheek" 20 years before the onset of malignancy. (2) The top of a mole on the back was knocked off by a cricket ball four years before malignant ulceration began. (3) A spark from an anvil injured the thumb, and "something was cut out" one year later. Seven and a half years later a melanotic tumour developed on the site with secondary deposits in the axillary glands. (4) A malignant melanoma developed on the site on a shrapnel wound of loin received eight months before. There had never been any moles on the site. The patient died four months later, and at post mortem Prof. Stewart found extensive metastases (liver, pancreas, testes, kidneys, heart, brain, bones, and gastro-intestinal tract). These cases may be compared with those of Eve (1903), where the tumour developed on the site of an injury received in one instance 20 years and in another 12 years previously. There is no record in this series of the probably more important factor of repeated slight trauma or irritation as emphasised by Dawson (1925), who noted in one case that simple repeated scratching of a mole was followed by rapid development of malignancy.

Comparison of Malignancy of Tumours of the Skin and of the Eye.—Out of 15 eye cases traced, five are alive and well, 19, 15, 13, 12, and 5 years respectively, subsequent to the removal of the eye. Out of 20 skin cases traced, only two are alive (toe five years, scapular region seven years). Taking deaths from all causes, it is found that ten eye cases survived operation for an average period of four years and two months, and 18 skin cases for two years and four months. Eve, judging from Lawford and Treacher Collins's cases of melanotic sarcoma of the eye, in which 20 out of 79 patients were alive three years after operation, states that the malignancy of this tumour is somewhat lower in the eye than in the skin. Broders and MacCarty report four eye cases in their series of 70 cases of melano-epithelioma, and reach the same conclusion. The lower malignancy of the tumours of the eye is probably not due to earlier treatment. These tumours metastasise by the blood stream, whereas the tumours of the skin usually affect the regional lymph nodes before generalisation. Protection of the eye from trauma and a less abundant blood-supply may be factors in the process. When metastatic or recurrent growth occurs, the rate of progress of the disease seems to be the same in both eye and skin cases. Thus in Lawford and Treacher Collins's series of 26 eye cases with secondary deposits the average duration of life after operation was two years and four months.

Total Duration of the Disease in Skin Cases.—The notes allow of an estimate of the total duration of the disease from the onset of malignancy (increased pigmentation of mole, increased growth or ulceration), in ten cases of melanoma of the skin with metastases. This period averages two years and ten months (shortest nine months in the case arising in a shrapnel wound, longest four and a half years in a melanoma of instep, both confirmed at autopsy). However, as mentioned above, one patient apparently survived 11 years in all. This finding is an agreement with Dawson, who states "the generalisation is said to average three years from the time of malignancy in the primary growth, but in my series it took place earlier in most of the cases."

Treatment.—The frequency of involvement of the regional lymphatic glands of malignant melanoma of the skin and the instance quoted of the patient who survived ten years after removal of glands invaded by growth, confirm the desirability of attacking the glands along with the primary tumour.

I am indebted to the honorary officers of the Leeds General Infirmary for permission to make use of their cases, and to Prof. M. J. Stewart for his interest and help.

References.

Broders, A. C., and MacCarty, W. C.: Surg., Gyn., and Obst., 1916, xxiii., 28.
Cairns, F. D.: Brit. Jour. of Surg., 1922–23, x., 290.
Eve, F.: Practitioner, 1903, lxx., 165.
Dawson, J. W.: Edin. Med. Jour., 1925, xxxii., 710 and 712.
Lawford, J. B., and Collins, E. Treacher: Roy. Lond. Ophth. Hosp. Rep., 1893, xiii., 104.

THE USE OF GLYCERIN IN CÆSAREAN SECTION

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Glycerin is now recognised by obstetricians as a valuable drug. It is used for drainage in local uterine sepsis and for the control of postpartum hæmorrhage in deliveries by the normal route. Little, however, has been written about its use as a hæmostatic in delivery by Cæsarean section. This year, on the suggestion of Dame Louise McIlroy, it has been used almost as a routine in the obstetrical unit of the Royal Free Hospital and has been found to be most successful in controlling hæmorrhage. Glycerin is also valuable in that it promotes drainage of the uterus during the puerperium.

The technique is simple. After removal of the placenta the uterine cavity is swabbed out with gauze

dipped in glycerin and held on a sponge holder. The uterus is wrapped in hot towels and the abdominal cavity and wound protected by mattresses. Retraction of the uterus nearly always follows at once.

It seems possible that this method may obviate the necessity for hysterectomy following Cæsarean section in the few cases where this is required, since it appears not only to control hæmorrhage but is of proven value in the treatment of local uterine infections. We have had no opportunity so far of testing this.

This method was used in the following seven cases, in all of which the classical operation was performed, the patients being in labour at the time of the operation.

CASE 1.—Primipara, aged 32. Antenatal condition normal; contracted pelvis. Labour, Jan. 29th, 1929: vertex presentation, membranes unruptured; one vaginal examination made. Cæsarean section for disproportion, hæmorrhage not excessive; glycerin used in cavity. Puerperium afebrile until sixth day when breast abscess developed.

CASE 2.—Multipara (2), aged 30. Previous children stillborn, died before labour began. Antenatal condition: toxæmia, poor general condition. Wassermann reaction negative. Admitted for some weeks before labour for rest and diet. Contracted pelvis. Labour, Oct. 22nd, 1928: vertex presentation, membranes unruptured; no vaginal examination made. Cæsarean section for disproportion; hæmorrhage very severe, controlled with the help of glycerine. Blood transfusion. Puerperium was febrile the first week. Temperature rose to 100·2° F. twice. Patient developed superficial abscess under left eye. Obstetrical condition satisfactory and no other cause found for pyrexia.

CASE 3.—Primipara, aged 27. Antenatal condition: *Bacillus coli*, pyelitis. Admitted for treatment; contracted pelvis. Labour, Nov. 25th, 1928: vertex presentation, membranes ruptured. One vaginal examination made. Cæsarean section for disproportion; hæmorrhage not excessive; glycerin and blue paint used in uterine cavity. Puerperium afebrile.

CASE 4.—Primipara, aged 22. Antenatal condition normal; contracted pelvis. Labour, Jan. 12th, 1929: vertex presentation, membranes unruptured; one vaginal examination made. Cæsarean section for disproportion; hæmorrhage profuse. Glycerin used—hæmorrhage controlled. Puerperium afebrile, involution somewhat delayed. Lochia normal. Glycerin drain on twenty-second day, after which uterus involuted normally. Toxic myocarditis.

CASE 5.—Multipara (2), aged 43. Previous children both stillborn after instrumental deliveries. Antenatal condition: toxæmic; admitted for rest and diet. Contracted pelvis. Labour, August 15th, 1929: vertex presentation, membranes unruptured. No vaginal examination made. Cæsarean section for disproportion; hæmorrhage fairly profuse, controlled by glycerin. Puerperium. Temperature 100·4° F. first night following operation, since afebrile.

CASE 6.—Primipara, aged 27. Antenatal condition normal; contracted pelvis. Labour, August 10th, 1929: vertex presentation; the patient ruptured her membranes four days before admission but had no pains and did not come to hospital; no vaginal examination was made. Cæsarean section for disproportion. Hæmorrhage profuse, controlled by glycerin. Puerperium was febrile for nine days. Maximum temperature 101° F. on seventh and eighth days. Lochia offensive. Glycerin drainage of uterus on eighth day. Temperature fell within 24 hours and has remained normal since.

CASE 7.—Multipara (2), aged 33. Previous children: (1) stillborn, (2) Cæsarean section for disproportion. Contracted pelvis. Antenatal condition normal. Labour, May 8th, 1929: Cæsarean section for disproportion, membranes ruptured; no vaginal examination made. Glycerin and flavine used in uterine cavity. Hæmorrhage not excessive; sterilisation performed. Puerperium. Temperature 101° F. once on the eighth day, otherwise afebrile.

The condition of all these patients and their infants were satisfactory on discharge. It is impossible to describe the rapidity with which retraction occurs when glycerin is used, but it is hoped that the account of these few cases will stimulate others to try this method for the control of hæmorrhage and for drainage of the uterus.

I am indebted to Dame Louise McIlroy for permission to publish these cases.

BRITISH MEDICAL ASSOCIATION.

ANNUAL MEETING IN MANCHESTER.

(*Continued from p. 613.*)

SECTION OF PUBLIC HEALTH.

MATERNAL MORTALITY.

Dr. R. VEITCH CLARK (Manchester), who presided over the discussions of this Section, said that maternal mortality was rather overshadowed by the mortality from the great killing diseases, but that it had an even more disastrous effect on family life. Maternal mortality had for its incidence only the child-bearing women, whilst tuberculosis had for its incidence the whole population. If we took the ratio of deaths to risk we should find that childbirth mortality was three times as great as that of any other killing disease.

The opening paper by Dr. J. PARLANE KINLOCH, chief medical officer, Department of Health for Scotland, was based largely on the conclusions arrived at in the Report on Maternal Mortality in Aberdeen, 1918–1927.[1] Dr. Kinloch submitted the thesis that with our present knowledge a significant reduction in maternal mortality would be immediately attained by an extension of adequate antenatal services and the institution of the new midwife-doctor combination defined in the report named. It had been shown that 90 per cent. of the deaths from sepsis were due to the hæmolytic streptococcus, on which attention should be concentrated. Prevention and treatment could not be separated because early treatment of puerperal sepsis involved isolation and the prevention of further cases of sepsis by contagion. One of the advantages of the notification of puerperal pyrexia had been the earlier discovery and treatment of sepsis cases. In consequence, during the four years for which pyrexia had been notifiable, the incidence of puerperal fever had increased from 3 per 1000 births prior to 1925 to 12 per 1000 births in 1928. This easlier discovery must have a profound effect on the efficacy of treatment.

Mr. J. BRIGHT BANISTER (London) thought there was a danger of going too fast in revolutionising the practice of obstetrics, and that acrimony should not enter into this great problem. He considered that autogenous infection was more common than some authorities would admit. Eclampsia and toxæmia could be greatly reduced by antenatal treatment. He favoured delivery in institutions, wherever possible, and thought this custom was one of the causes of the low maternal mortality in Scandinavian countries.

Prof. D. DOUGAL (Manchester) said there had been much needless exaggeration which might almost lead one to believe that the process of coming into the world was as fatal as the process of passing out of it. It was, however, true that with our present knowledge 50 per cent. of the deaths need not occur. Sepsis was the greatest single cause. Some general practitioners still employed handywomen, and even nurses with the C.M.B. certificates had low ideals of asepsis. The asepsis of the general practitioner might be improved. Hæmorrhages could not be foreseen, but might be due to faulty conduct of labour. There should be a longer training of medical men with a view to more conservative midwifery. The relief of pain should receive attention, with a view to the avoidance of unnecessary operations. We had to consider how the general practitioner was to get experience if he did no normal cases in accordance with the new proposals. The training of the midwife should be improved and she should go through a pupilage. Handywomen must go. Sterilised outfits must be provided. The general practitioner's status would be improved if he were relieved of normal cases. A separate anæsthetist should be available

[1] See THE LANCET, 1929, i., 85.

and a consultant should be within call. He favoured the use of portable obstetric tables, and expressed his approval of the proposed midwife-doctor combination.

Dr. H. L. MURRAY (Liverpool) also advocated hurrying slowly. We were awaiting the result of the national inquiry. He spoke in favour of antenatal treatment and the acquisition of a surgical intranatal sense. The expectant sense had been to some extent lost. In some cases the midwife insisted upon the doctor operating. Sepsis sometimes occurred in an unaccountable manner. Doctors should only employ midwives, but he thought the doctor should be present at normal confinements.

Dr. A. K. CHALMERS (Glasgow) pointed out the advantages of a hospital on the pavilion system for the separation of clean from suspected cases. Antenatal examination should be made a condition of admission to a maternity hospital.

Dr. JAMES YOUNG (Edinburgh) expressed his approval of the scheme of the Association for a national midwifery service. He thought the bogy of autogenous infection had been laid and that the statistics of the East End Maternity Hospital proved that it was negligible. He agreed with Dr. Chalmers as to the advantages of pavilion hospitals and that they must not have normal and abnormal cases in one building. Cæsarean cases were liable to be infected by contagion.

Dr. W. H. F. OXLEY (London) said that the East End Maternity Hospital had been going for 40 years. It was staffed by midwives who called in the general practitioners in the neighbourhood. Much of the credit for the good work was due to the head midwife, Miss Anderson, whose enthusiasm had inspired her staff. They had been doing antenatal work before Ballantyne began. Their cases were booked early and a forward look-out was kept. They had almost stamped out eclampsia, as among the last 10,000 confinements there had been only one slight fit in the present year. By intensive indoor treatment for albuminuria and by induction in cases which did not clear up under it, they were going a stage further than preventing eclampsia, and had reason to believe that they were diminishing the incidence of recurrent toxæmia and of chronic nephritis. Their treatment for placenta prævia included as little manipulation as possible. Early turning was not always needed. They had had no maternal death from placenta prævia among the last 14,000 cases. He thought antenatal treatment might be carried too far and become too much of a "stunt." Antenatal care was the preparation for the battle and the main thing was wise midwifery at labour. Their midwives did not use gloves but a proper strength (1 in 1000) of perchloride of mercury. Several pupil midwives examined each case but with carefully disinfected hands, and no harm was done thereby. The primipara had a threefold risk of puerperal pyrexia, and he had satisfied himself that this increased risk was due to trauma of the cervix. No doctor with an obstetric conscience could be forced by a midwife to interfere or to use forceps. If he had not developed such a conscience it was the fault of his teaching.

Dr. FARQUHAR MURRAY (Newcastle-upon-Tyne) thought the pupil midwives, who were practically handywomen, should not be too numerous. The hospital cases should be divided into clean, suspect, and dirty, and there would be no rise of temperature in the "clean" wards. Consulting obstetricians were needed for domiciliary cases. In nursing homes a separate nurse should be provided for each case. Special nurses should be provided for cases with early signs of sepsis through a domiciliary nursing service of a maternity hospital. He thought antenatal examinations should be conducted at a special centre and not in a doctor's surgery. He also spoke against the abuse of lysol.

Prof. J. HENDRY (Glasgow) agreed in deprecating the abuse of lysol and of vaginal examinations unnecessarily and badly done by midwives. Refresher courses for midwives were very necessary. A larger proportion of the doctors' cases were abnormal, because they included primiparæ, those who had had difficulty in previous labours, and those who desired to have chloroform and forceps. If the puerperal temperature was charted four-hourly much more pyrexia would be shown.

Dr. ARTHUR GILES (London) thought that general practitioners should attend normal labours. They must not, however, apply forceps to save their own time, and they should have a maternity hospital available for their patients. He believed in boiled gloves rather than perchloride.

Miss FRANCES IVENS (Liverpool) said that they needed properly educated midwives and must see that they were properly paid.

Prof. C. G. LOWRY (Belfast) said they need not wait for research but could apply the well recognised principles adopted at the East End Maternity Hospital. A rise of blood pressure always preceded albuminuria. There had been no case of eclampsia for nine years in his hospital. He disagreed with Mr. Bright Banister with regard to autogenous infection. Morphia and hyoscine were useful for avoiding interference in labour. It might also be good to use similar sedatives for the relatives! He was somewhat surprised at the number of vaginal examinations permissible for pupil midwives at the East End Hospital. He believed that ill-washed hands and unnecessary separation of the labia minora were frequent causes of bad results. Antenatal work should be done by those who would conduct the labour.

Dr. MIDDLETON MARTIN (Gloucester) thought the B.M.A. report a very practical contribution. In Gloucestershire the services of obstetric consultants were available, and there were maternity beds in each cottage hospital.

SECTION OF NEUROLOGY AND PSYCHOLOGICAL MEDICINE.

THE DIAGNOSIS OF FRONTAL TUMOURS.

Dr. JAMES COLLIER (London) opened the discussion. He said that from the very nature of the cerebral hemispheres the regional diagnosis of disease situated therein was often a matter of peculiar difficulty. In considering the possible signs of tumours within the frontal lobe, if we were to advance in knowledge, we must divest our minds of any idea of local function, mental or otherwise, peculiar to lesions of the prefrontal lobes. We must expect a varying clinical picture, and often one which was negative so far as localising symptoms were concerned. It must be borne in mind that there exists a great facility in compensation for local lesions within this region, so fully emphasised by Gowers 40 years ago, and also the disturbing effects that long-standing increase of intracranial pressure and hydrocephalus have upon the value of those signs which are used for localisation. We must strive to collect those signs which have been useful to us in the successful localisation of frontal lobe tumours. He might conveniently divide the signs which are used for the localisation of a tumour within the prefrontal lobes into five categories, thus: (1) the negative signs; (2) the contiguous signs; (3) the signs which have been deemed peculiar to, or especially marked in, prefrontal lesions; (4) the signs peculiar to lesions within the anterior fossa of the skull; and (5) the signs revealed by ventriculography.

Five Categories of Signs.

Negative Signs.—The negative signs were of especial importance, since tumours within the posterior fossa below the tentorium, and those of the occipital, parietal, central, and left temporal regions, except sometimes in their latest stages, gave unmistakable signs of their position. If no definite localising sign was present, therefore, it was often a matter of a prefrontal or a right temporal site.

Contiguous Signs.—The contiguous signs were those produced by the extension of some process connected

with the growth—pressure, œdema, or vascular disturbance—into the neighbouring ascending frontal gyrus and giving rise to motor weakness. Extension might occur into the insula of the left side, giving rise to interference with the execution of language, or into the paths converging to the anterior part of the corpus callosum and so producing motor apraxia. The motor weakness was usually seen first and most in the face, rarely in the arm, and almost never in the leg. It was perhaps the most important lateralising sign of a frontal tumour, but it did not distinguish a frontal tumour from a temporal tumour, which also frequently caused facial weakness as a contiguous sign. Difficulty in the exteriorisation of language was a certain lateralising sign of a left hemisphere lesion in a right-handed person, but it was also caused by tumours of the left insula and those of the anterior temporal region. It should be of the nature of a stammering defect or of a "pure aphasia" if due to a frontal lobe lesion. Pure executive apraxia appeared to be a certain sign of prefrontal involvement and to indicate a left-sided lesion. Presumably it pointed to a lesion extending deeply and far back in the upper two prefrontal convolutions.

Signs Peculiar to the Frontal Lobe.

Mental Symptoms.—Mental changes of a very variable order, from slight changes in the way of loss of reserve, childishness, and change of character, to severe disturbance such as megalomania, "witzelsucht," and dementia did result from tumours of the prefrontal region. Dr. Collier wished to ask whether the Section agreed with Cushing's very confident statement that mental changes were always much more conspicuous in left-sided lesions, for he, the speaker, was doubtful as to this point. Extensive lesions of the frontal lobe often existed without any obvious mental change. The explanation seemed to lie in the possibility of compensation, and whether the other frontal lobe was relatively intact as regards its callosal connexions, since bilateral frontal lesions always gave rise, both experimentally and clinically, to marked mental reduction. The point of importance was whether mental changes were of sufficiently higher incidence in prefrontal lesions, as compared with lesions of other regions of the brain, as to make them reliable symptoms when other localising symptoms were absent. The speaker wished specially to emphasise the early loss of memory and the mental reduction occurring in tumours of the splenium callosi, because it might be the key to the explanation of mental changes and their variability in cases of cerebral tumour. He suggested that in lesions of the prefrontal lobe mental changes were only conspicuous when the tumour extended deeply and cut the callosal and other transcortical paths.

Frontal tremors, more marked upon the homolateral side and sometimes confined to that side, like other signs at first described as indicating prefrontal lesions, had come to belong also to the temporal lobe.

The "*grasping and groping*" *reflex* was, as far as he, the speaker, knew, a certain sign of prefrontal location which had not yet been seen with lesions elsewhere. Dr. Gordon Holmes thought it was seen with very extensive frontal lesions, but the speaker disagreed with this opinion. Dr. M. Critchley associated it with lesions high up and far back in the prefrontal region.

Conjugate deviation of head and eyes, or of eyes alone, to the contralateral side, explained by the involvement of the frontal ocular area said to occupy Exner's region in the second frontal gyrus, had been repeatedly emphasised as of locating and lateralising value. It seemed to the speaker certain that every cortical region must of necessity be an origin for inducing conjugate deviation, considering the necessary association in life of conjugate deviation with every movement and sensation, and therefore conjugate deviation could not be in any way special to the prefrontal lobes; nor did he believe that there was any special region for this function. When present it was of certain lateralising value for tumours in any part of the hemisphere. It might be seen in the form of persistent deviation to the contralateral side, or of weakness and unwillingness in deviation to the homolateral side.

Loss or diminution of the trunk reflexes might be of great lateralising value and was said to be valuable in frontal location. But he held that it was much more characteristic of the temporal tumour.

Incontinence was sometimes very marked in frontal tumours, even when the mental aberration was inconspicuous. He thought he had seen it more often in temporal tumours.

Papillœdema was said by Mr. Leslie Paton to occur earlier and more severely with tumours of the hemisphere the farther forward these were situated. Recently Stopford had analysed another series of cases, and had come to the conclusion that the more posterior the situation the earlier and more intense the papillœdema. The speaker was inclined to agree with Stopford, although he did not think papillœdema was of any value either in localisation or lateralisation.

Lethargy of a deep but rousable kind had occurred many times in frontal tumour, and when existing without headache or papillœdema it had caused several cases to reach the post-mortem room with the label "lethargic encephalitis."

Fits of different kinds often occurred with frontal tumours. The convulsions he had seen had always commenced with conjugate deviation, which deviation had been a sure lateralising sign. Status epilepticus was an interesting frontal symptom. He had no knowledge of any other region of the brain in which a tumour had produced status epilepticus.

There remained for consideration certain phenomena, such as Meyer's reflex, Leri's reflex, and Hoffmann's reflex, which were said to be absent in prefrontal lesions, and Wessenberg's sign which was supposed to be found only when a prefrontal lesion was present.

Lesions of the Anterior Fossa.—Ventriculography.

Signs peculiar to lesions of the anterior fossa were those of pressure upon the olfactory tract, the optic nerve or chiasma, or upon the nerves and vessels passing through the sphenoidal fissure, and those of bony involvement. These were always certain localising and lateralising signs, but they only obtained with a hard tumour coming to the surface of the orbital lobe or with a growth of meninges or bone.

There remained the method of ventriculography, which in skilled hands had resulted in many brilliant successes in this and in other difficult regions of the brain.

Discussion.

Dr. W. J. ADIE (London) said that the "grasping reflex" had been of value in localising tumours of the opposite frontal lobe. The fully developed reflex was very striking but it also appeared in various incomplete forms; hence the term "grasping reflex" did not cover the entire phenomenon. In his opinion, it was not necessarily confined to extensive lesions. The fits seen in frontal lobe tumours might consist of some movement of the head, eyes, and trunk to the opposite side with simultaneous involvement of the limbs of the contralateral side. Such an attack, however, might also occur in temporal lobe tumours. A fit beginning with clonic movements of the eyes with deviation to the opposite side was of localising value in frontal lobe tumour; in fact, such movements might constitute the entire fit. Meyer's reflex was of great value, a unilateral exaggeration being a lateraliser to the opposite side and a localiser to the opposite frontal lobe. Dr. Adie considered that ventriculography was of great assistance in frontal lobe tumours.

Mr. GEOFFREY JEFFERSON (Manchester) considered that ventriculography could be well replaced by the method of "ventricular estimation." This consisted in the bilateral tapping of the ventricles by the

occipital route, the withdrawal of cerebro-spinal fluid from each, and the comparison of the volume of the two fluids. He had not found the injection of dyes of great value. Mr. Jefferson then described certain cases of frontal lobe tumour which he had encountered, and illustrated his cases with admirable lantern slides.

Dr. L. J. J. MUSKENS (Amsterdam) said that he had also met with a case of frontal lobe tumour showing the sudden occurrence of status epilepticus without previous symptoms. Bruns had called attention to ataxia and vestibular symptoms in frontal lobe tumours. In 1917, he (the speaker) had pointed out that cats, after extensive right-sided lesion, and patients with right frontal tumours, tended to fall to the left. This observation was confirmed by Grossmann in 1919, who described six cases of frontal lesions from bullet wounds, all of whom fell to the contralateral side.

Dr. C. WORSTER-DROUGHT (London) considered that mental symptoms were more frequent in frontal lobe tumours than in those affecting other regions of the brain. In his experience the mental symptoms associated with right-sided lesions were slighter than those accompanying left-sided lesions; the former might consist of mental memory defects while the latter varied from euphoria to dementia. He agreed that involvement of the white matter of the brain was the important determining factor. Tremor he had found of no assistance, but the "grasping reflex" was a valuable sign when present; it was, however, often absent. Incontinence was a very frequent sign of frontal lobe tumours and might be the only symptom present or occur with only slight mental dullness. The absence of the epigastric and abdominal reflex on the homolateral side was also helpful. He had been impressed with the frequent absence of headache in cases of frontal tumour he had seen. Air ventriculography was of considerable assistance, but he had come to regard the procedure as somewhat risky in posteriorly situated tumours; he was, therefore, glad to hear Mr. Jefferson's opinion regarding the value of ventricular estimation.

Dr. J. GODWIN GREENFIELD (London) commented on the extraordinarily long history and the hardness of the tumour often met with in the astrocytoma type of frontal glioma. There was a greater tendency to degeneration and cyst formation in frontal lobe tumours; probably this resulted from some peculiarity of the blood-supply.

Dr. M. CRITCHLEY (London) stated that the phenomenon described by Adie and himself as "forced grasping and groping" had been originally reported by Janischewsky as the "réflexe de la préhension." The phenomenon was made up of several component parts. First, it comprised a slow and gentle flexion movement of the fingers on stimulation of the palm. The second phase consisted in a forceful and involuntary closure of the fingers when an attempt was made to withdraw an object from the patient's hand. The involuntary nature of the inability to relax the grasp was shown by the fact that a painful stimulus—e.g., a live electrode—still elicited an identical firm closure of the hand. After the object had been finally extracted from the patient's hand, the third phase of the phenomenon became manifest by a slow full extension of the fingers followed by a slight closure. In this way the patient's hand might again grasp the object that had just been withdrawn ("after-grasping"). In some cases a fourth phase was seen; during the examination of some other part, the patient's affected hand continually obtruded itself by clasping or groping towards the examiner's hands ("forced grasping"). It was now realised that the grasping phenomenon might affect regions other than the hand—e.g., the sole of the foot and the jaws. Although forced grasping and groping might be seen in various states of stupor and coma, and in some cases of diffuse cerebro-vascular disease, its presence in cerebral tumour usually indicated a frontal localisation. Although of great localising value, its importance as a lateralising sign required qualification. Cases have been noted in which the grasping phenomenon had occurred on the same side as the tumour, but in such instances there had been a severe degree of hemiplegia on the contralateral side. Presumably in such cases the tumours were large ones capable of producing bilateral signs.

Dr. F. R. FERGUSON (London) emphasised the importance of investigating all possible channels of information. Daily physical examination of the patient often revealed such variation in the physical signs that it was impossible to correlate them and localise the tumour. He instanced a case showing a marked right-sided "frontal tremor" but with other signs at one time indicating a left-sided frontal lesion and at others a right-sided. At autopsy a cholesteatoma was found exactly in the middle line at the posterior end of the corpus callosum. With regard to the localising value of the "grasp reflex," he mentioned a case with a right-sided grasp reflex in whom a left cerebellar tumour was found at autopsy. The cerebration and coöperation of this patient, however, were very poor and there was evidence of secondary hydrocephalus.

Mr. A. A. MCCONNELL (Dublin) considered that ventricular estimation was of more value in lateralising than in localising, and especially with frontal lobe tumours. A fallacy, however, was that frontal tumours might occlude the foramen of Monro and prevent the air reaching the opposite side.

SECTION OF OPHTHALMOLOGY.

Mr. J. GRAY CLEGG (Manchester) being in the chair, Mr. W. H. KIEP (Bradford) read a paper on a modification of

Lagrange's Operation for Glaucoma.

He referred to cases of late infection after trephining operations, and said it was obviously desirable that the membranous covering of any such fistula should be sufficiently thick to prevent entrance of organisms or their toxins. The operation he had adopted recently was a modification of Lagrange's; it had the merit of being easier to perform, and also of making a less extensive wound of the sclera. His own procedure was as follows: the conjunctiva and subconjunctival tissues were grasped with forceps 6 or 7 mm. above the limbus, and divided with scissors; Tenon's capsule was also divided, and a flap including these structures was reflected; a groove was cut in the sclera 2 to 2½ mm. above the limbus, making a small furrow here; a keratome incision, of 3 to 4 mm., was made through this furrow; the keratome was withdrawn as quickly as possible in order to avoid any great loss of aqueous; the prolapsed iris was removed, securing a peripheral iridectomy; a small piece of the anterior lip of the incision was excised with scissors; the conjunctival flap was sutured with one stitch; it was practically always possible to get the iris back into position by manipulation without introducing any repositor into the anterior chamber; in this way further loss of aqueous was avoided. The drawback of the operation was that sometimes episcleral vessels of considerable size were cut. Otherwise he had found this operation no more difficult than Elliot's, and less difficult than Lagrange's. There was a minimum disturbance of intra-ocular structures. It was often possible to do it with little loss of aqueous. On an average, the anterior chamber regained its normal depth in from 48 to 72 hours after the operation. A fistulous orifice of 2 mm. width was obtained. There was ample protection from late infection. He had performed the operation successfully in one case where a large iridectomy had previously been done.

Mr. W. B. INGLIS POLLOCK (Glasgow) said that now for some years he had kept strictly to the Lagrange operation. Where the tension was much raised at the time of the operation he always did a

posterior sclerotomy; the Lagrange operation could be done immediately after the posterior sclerotomy.

Mr. A. B. CRIDLAND (Wolverhampton) said that after seeing Lagrange do his operation at Oxford in 1907 he had adopted it. There was no doubt that it was a difficult operation. An essential point was that you must "shave the base of the iris." Tension should first be brought down as low as 40. Any modification of Lagrange's operation that made it easier was to be welcomed. In 20 years he had never seen a case of late infection after it.

Mr. A. F. MACCALLAN (London) said that for the last five years he had never seen a case of late infection after trephining among his own cases or those of his colleagues. He had frequently seen superficial inflammation of the conjunctiva in trephined eyes without any infection of the deeper structures. Where hæmorrhage from episcleral vessels occurred he had found the application of a little dry wool moistened with adrenalin solution sufficient to arrest the bleeding.

Mr. H. H. MCNABB (Manchester) mentioned a case of late infection which occurred 18 years after an Elliot's trephining operation.

Mr. E. E. MADDOX (Bournemouth) described some modifications of Lagrange's technique which he had adopted. One of these consisted in slicing the crescent of sclera—i.e., making a series of transverse cuts in it with scissors.

The CHAIRMAN said he had adopted Elliot's trephine operation almost regularly, with slight modifications and had not seen late infection following it for a considerable time.

Mr. KIEP, in reply, said it was a matter of the utmost importance that the diaphragm of the eye should not be allowed to come forward. He had given up doing posterior sclerotomy, because he found that tension could be sufficiently reduced by medical means—bed, saline cathartics, eserine, dionine, and fomentations; and he had found Duke-Elder's method of reducing tension by intravenous injection of hypertonic saline solution very useful. In certain cases there was danger of hæmorrhage from posterior sclerotomy. As to the difficulty of Lagrange's operation, that was a matter of personal opinion. There were certainly some expert operators who found it presented difficulty. In his experience it was far easier to place the incision accurately with a keratome than with a Graefe knife. His own method involved only the minimum of fuss and hæmorrhage. He would not advise operation in cases of very high tension especially if it had been present for some days, particularly in old people with degenerated arteries. In such cases he would first reduce tension by Duke-Elder's method, and operate about a week after.

Mr. CRIDLAND (Wolverhampton) then read a paper on

Minor Injuries of the Eye in Industry.

These injuries, he said, ranked high in the list of causes of blindness. Not less than 100 cases of total blindness per annum were due to this cause in the United States of America. Eye injuries, according to Prof. Collis, constituted 5 per cent. of all accidents in industry reported by certifying surgeons. Estimates of the proportion of cases of blindness due to accidents varied from 7·2 per cent. in Scotland to 13·5 per cent. in U.S.A. In this paper his object was rather to direct attention to the minor injuries of the eye, and especially to their economic effect, as well as the steps necessary for their prevention. At his own hospital at Wolverhampton 6880 cases of accident to the eye had been dealt with in 1928, as compared with 6040 other new cases due to disease or requiring refraction testing. In the last 20 years the proportion of accidents to other cases at this eye hospital had increased from 39 per cent. to 53 per cent. The vast majority of these were, of course, minor injuries, especially foreign bodies, mostly small, that did not penetrate the eye. In 1928 the giant magnet was only used in 12 cases. From the point of view of occupation these patients might be divided into three groups: (*a*) occupations involving exposure to small flying particles—e.g., from grindstones or emery wheels, 51 per cent.; (*b*) occupations involving exposure to chips of metal, 26 per cent.; (*c*) miscellaneous—miners, roadworkers, painters, plasterers, &c., 23 per cent. Injuries varied in severity from a simple foreign body on the cornea to burns of the eyelids, or lime in the eye. Foreign bodies on the cornea furnished no less than 90 per cent. of the cases. Abrasions of the cornea provided 5 per cent., and there were 5 per cent. of miscellaneous injuries including burns, contusions, &c. In regard to protection, the following facts were elicited, based on information in 406 cases:—

1. Protection was not available in 70 per cent.
2. Protection was admitted to have been available, but not used, in 19 per cent.
3. Protection had been made use of, but had not prevented the injury in 11 per cent.

As regards time lost from work owing to the accident a series of 426 cases were divided into three groups:—

1. Those who lost from 1 to 2 hours, comprising those presumed able to return to work at once—371 cases.
2. Those who lost from 2 to 8 hours—48 cases.
3. Those who lost from 8 to 24 hours—7 cases.

The above figures probably underestimated the time actually lost. All things considered, it would be within the mark to say that on the average three of these minor eye injuries meant that the employer lost a full day's work. From the point of view both of employer and employed it was a matter of urgency to prevent such injuries. There were two obvious ways of doing this: (1) to ensure that the flying particle did not reach the eye, and (2) better still, to eliminate the flying particle altogether. On these two essentials the three main principles of prevention were based: (1) mechanical guarding, (2) education of workmen and foremen, and (3) engineering revision. Under the first heading came goggles of various forms, machine guards and shields, face-masks, helmets, or hoods. Goggles of the right kind properly worn and kept in order were the most important of these. The difficulty lay in producing ideal goggles at a reasonable price. For workers at emery wheels, a cheap but very effective form of protection against light particles was a piece of silk gauze worn as a veil over the eyes. These could be supplied at 2*s.* a dozen. Workmen should be made to realise the risk they ran, and how best to avoid the danger. In the third method of prevention, engineering revision, lay the hope of the future; it sought to eliminate the underlying cause, not merely to cover up the danger points. This end might be attained by the changing of a process of manufacture, by the redesigning of a machine or tool, or rearrangement of the physical equipment of a plant, or changing of the method of work. The introduction of the automatic machine was one instance. In America some success had followed the employment of "safety engineers"—men whose duty it was to concentrate on engineering revision, and also to give special attention to the education of the workmen by propaganda and various ingenious and telling methods. For instance, in one workshop an enucleated eye was hung up in a bottle in a conspicuous place as a warning. The psychology of the workman must be considered. In this country, perhaps, education in this matter was more difficult owing to the spirit of indifference to danger, coupled perhaps with ignorance of the risks run. The subject was a very wide one, and each type of occupation called for special study and investigation. At present the economic loss from this cause was not realised.

Mr. N. BISHOP HARMAN (London) mentioned that it was possible for flying particles to pass between the goggles and the face, and strike the eye—e.g., in overhead work.

Mr. T. AUBREY JONES (Stoke-on-Trent) spoke of the deeply rooted opinion among miners that glasses of any kind are an absolute danger when working down in a coal mine. He had seen very few injuries caused by wearing glasses. Many injuries in the

mines would be prevented by wearing ordinary glasses. He thought Mr. Cridland's estimate of time lost by these injuries was too low.

Mr. H. L. G. LEASK (Glasgow) also referred to the miner's strong prejudice against glasses.

Mr. TUDOR THOMAS (Cardiff) said that in mines clouding of the glasses by dust and by sweat, especially in hot mines, might increase the liability to accident.

Mr. H. R. BICKERTON (Liverpool) said that each occupation required its own form of protection. It was useless to try to educate the workmen. They must preach to the employers and insurance companies.

Mr. CRIDLAND, in reply, said he had only touched the fringe of the subject. Ricochet would explain many of the cases where a flying particle got behind the workman's goggles. Side-pieces to the protective goggles had the objection that they were likely to cause sweating and dimming of the glass. In regard to miners, he did not think they would be induced to wear glasses, nor did he think it feasible that they should. All emery wheels ought to be fitted with proper guards. He wished to emphasise another aspect of these injuries—namely, the unnecessary burden thrown on the hospitals by the large number of these preventable accidents. In his experience insurance companies were very hard to educate in this matter.

Dr. T. L. DE COURCY (Liverpool) read a paper on the

Significance of Vitreous Opacities.

After referring to the work of Miss Ida Mann and Mr. Duke-Elder, he pointed out that any alteration in the metabolism might affect the vitreous. Many focal infections might show no other result in the eye but vitreous opacities—e.g., the dust-like opacities in the vitreous in syphilis. By careful ophthalmoscopic examination in three series of 100 consecutive patients he had found vitreous opacities in about 37 per cent. Few of these patients complained of any symptoms due to them. They were comparatively rare in children. Early cataract was frequently associated—and possibly the causation was the same.

Mr. MACCALLAN said that in a series of 100 cases, all of whom had normal vision with correction, he found vitreous opacities in a much greater percentage than Dr. de Courcy by examination with the slit lamp. In children with enlarged and septic tonsils the vitreous was never clear.

Mr. J. JAMESON EVANS (Birmingham) read a paper on

Blindness in Old Age,

based on some 700 cases examined with reference to their inability "to perform work for which eyesight is essential." This was the Government's definition of blindness. This series included 205 cases of cataract—of which 37 per cent. were certified as operable. There were 43 cases of retinitis pigmentosa. Among the optic atrophy cases 13 per cent. were due to syphilis, 10 per cent. were of cerebral origin, and the rest of unknown origin. There were nine cases due to ophthalmia neonatorum, and nine cases due to sympathetic disease. In myopic cases blindness was due chiefly to choroido-retinal degeneration.

Mr. HARMAN was surprised to hear that cataract headed the list as a cause of blindness in old age in these cases. His impression was that degenerative or inflammatory changes at the macula were the chief cause. 6/60 had been suggested as a definite standard for these cases. He was strongly opposed to any such stringent and rigid definition of blindness for certification for Government regulations. In each case the decision should rest with the ophthalmic surgeon. It must be remembered that they were not asked to certify that the patient could do his own work, but that he could not see to do *any* work for which eyesight was essential. Many domestic workers who had never worked outside their own families were now applying for pensions under these regulations.

Reviews and Notices of Books.

A SYSTEM OF BACTERIOLOGY IN RELATION TO MEDICINE.

By various authors. Vol. III., pp. 413. By W. BULLOCH, P. FILDES, A. T. GLENNY, H. HENRY, R. T. HEWLETT, R. A. O'BRIEN, S. G. PAINE, G. F. PETRIE, MURIEL ROBERTSON, R. ST. JOHN-BROOKS, W. G. SAVAGE, A. C. THAYSEN, H. G. THORNTON, R. L. VOLLUM. London: H.M. Stationery Office. In 9 volumes. £8 8*s.* or £1 1*s.* per volume.

THE Medical Research Council have sponsored many notable contributions to scientific medical literature since the publication in 1915 of the first number in the special report series at the modest price of 3*d.* The familiar green books are to be found in laboratories and libraries all over the world, and include records of investigations which would never have been undertaken except under the auspices of the Council, and could scarcely have been published in any other form. The most ambitious literary project of the Council is the System of Bacteriology of which the first volume (Vol. III.) has just been issued. The system, which is to be published in nine volumes, is the work of some 100 British bacteriologists. The general editorship is in the hands of Dr. Paul Fildes and Prof. J. C. G. Ledingham, and Dr. Fildes has been assisted in the heavy work of organisation and preparation by Dr. Edgar Schuster. Probably few people are in a position to appreciate to the full the amount of work entailed in the editing of a complicated publication of this nature; it must have been immense, and the editors are to be congratulated on the manner in which they have performed their task.

There will be no two opinions as to the need for such a publication as this. There are numerous excellent text-books of medical bacteriology in the English language, but there is no really comprehensive work which takes cognisance of the whole range of bacteriology in its relation to medicine. As Lord Balfour points out in his general preface, the subject of bacteriology is so vast and covers so many fields of human activity that it is impossible for any one man to keep in touch with all its developments. Hitherto it has been difficult for any worker in one field to make himself acquainted with the progress being made in another; the medical bacteriologist, for example, may be profoundly ignorant of the important work being done by his veterinary colleagues or by the agricultural bacteriologist; and even in medical bacteriology specialisation has advanced to such a degree as often to isolate the pioneer. But with this system at his elbow it will be possible for everyone interested in the subject to form some general picture of the whole; and should he desire to go deeper into the matter he will find guidance to the original sources he should consult. Moreover, in a survey of this kind the gaps in our knowledge are likely to become apparent.

Vol. III., the first of the series to be published, deals with Economic Bacteriology, Plague, Anaerobes, and Food Poisoning. In Chapter I. A. C. Thaysen deals with the economic aspects of bacteriology, including baking, retting, decomposition of cellulose, the fermentation of indigo, coffee bean, tobacco, starch, and sugar, the decomposition of nitrogen compounds, and the bacteriological aspects of the formation of minerals, including coal. In Chapter II., H. Henry discusses the bacteriology of water and the examination of water-supplies. Chapter III., by R. L. Vollum, is devoted to the bacteriological aspects of the dairy industry, and in Chapter IV. W. G. Savage deals with other foodstuffs. Soil bacteria are considered in Chapter V. by H. G. Thornton; Chapter VI., Bacterial Diseases of Insects, is in the hands of R. St. John-Brooks, and in Chapter VII., S. G. Paine treats of the bacterial diseases of plants. These seven chapters occupy about a third of the volume; their subject

matter is condensed and, indeed, treated somewhat superficially. Nevertheless they form an interesting and valuable contribution; the authors have shown considerable judgment in determining what to leave out, and the medical bacteriologist will be grateful for this résumé of a subject with which he is rarely familiar. In Chapter VIII., which deals with *Bacillus pestis*, we are on better-known ground. This section is contributed by G. F. Petrie and is preceded by a short historical note by W. Bulloch. After discussing the general bacteriology of *B. pestis*, the author turns to the problems of plague immunity, and then deals with the transmission of the infection by the rat-flea, natural plague in rodents and other animals, and bubonic and pneumonic plague in man. Dr. Petrie has written a very complete and satisfying account of his subject, but it is perhaps a pity that his contribution should have been separated from that dealing with the Pasteurella group, which is to appear in Vol. IV.

Miss Muriel Robertson deals in the next section with the organisms associated with gas gangrene, and as we should expect, gives an admirably clear and lucid summary of this very difficult subject. In a brief historical summary she shows how the complexities which have surrounded this group of organisms have arisen, and then proceeds to describe the more important and definite varieties. Pathogenic action, resistance, and immunity are next discussed, and the chapter closes with a section by R. A. O'Brien on the preparation and testing of toxins and antitoxins, and prophylactic mixtures. A serious omission in this article is the absence of illustrations, and this applies to the rest of the volume, excepting the chapter on soil bacteria which contains 13 charts and figures. Readers of the Council's special report series Nos. 12 and 39, which dealt with the anaerobic organisms, will recall the really beautiful illustrations which enriched these publications and will regret that they are not reproduced here. In Chapter X. Dr. Paul Fildes gives an admirable account of *Bacillus tetani*. Here again the article is conceived on the broadest lines, and much attention is devoted to the pathological effects of the organism, its portals of entry, the mechanism of infection and intoxication, and immunity. The organisms resembling *B. tetani* are briefly discussed, and R. A. O'Brien and A. T. Glenny contribute an account of the production of antitoxin for therapeutic purposes. The chapter is introduced by an historical note by W. Bulloch. Chapter XI., on *Bacillus botulinus*, is by R. Tanner Hewlett, with sections by W. Bulloch and R. A. O'Brien, and the volume ends with a short chapter by W. G. Savage on Bacterial Food Poisoning.

The general subject index is to appear in Vol. IX., and there is no index in this volume, but the table of contents is very full and complete. We have nothing but praise for the general format of the volume. It is dignified and workmanlike, and in every way worthy of what will be a notable publication.

LETTERS FROM ROME.

Letters from Rome on Certain Discoveries Connected with Malaria. By T. EDMONSTON CHARLES, M.D., Q.H.P. With Addenda, consisting of an article by S. CALANDRUCCIO, letters from ROBERT KOCH and A. LAVERAN, and a statement by Lord LISTER. Edited, with Preface and Remarks, by Sir RONALD ROSS, K.C.B., K.C.M.G., F.R.S. London: Ross Institute and Hospital for Tropical Diseases, Putney Heath. 1929. Printed by Harrison and Sons, Ltd. Pp. 78.

DURING the time when Sir Ronald Ross was investigating the connexion between mosquitoes and malaria, certain Italian observers, of whom Prof. Grassi was the leader, were also engaged in the experimental study of the problem. The priority of Sir Ronald Ross's discovery of the zygotes is no longer in doubt, but in order that it shall be finally established he has now published certain letters written to him at the time by Dr. T. Edmonston Charles. The letters cover a period from Nov. 4th, 1898, to Jan. 14th, 1899, and are fully annotated by Sir Ronald Ross, who has also supplied explanatory postscripts. Other confirmatory documents are included in the book, and a list of the published literature immediately connected with the subject is set out in chronological order. Letters from Robert Koch and A. Laveran expressing disapproval of the attitude of the Italian school are also printed together with a statement, quoted from the *Times*, made by Lord Lister. Lister's reminder of the candour, openness of mind, and readiness to recognise the work of others shown by Ross is worth recording for the benefit of future generations, who may see only Ross's own writings, which will survive, but not the attacks to which they provide adequate answers.

THE TOXÆMIAS OF PREGNANCY.

By H. J. STANDER, Associate Professor of Obstetrics, Johns Hopkins University Medical School. London: Baillière, Tindall and Cox. 1929. Pp. 161. 13*s.* 6*d.*

THIS book, forming Volume XV. of the Medical Monograph series, is intended, as are its companion volumes, to provide teachers, clinicians, and laboratory workers with a critical digest of recent views in convenient and readable form. The first 15 pages are occupied with a description of the metabolic and other changes occurring in normal pregnancy, and the remainder of the book with a very full consideration of the toxæmias of pregnancy, amongst which antepartum hæmorrhage is not included. A good discussion of the theories of causation of hyperemesis and of the chemical changes in the blood and urine is included. The author believes that all cases are based on an underlying toxæmia, though in some women the toxæmia may be so obscured by a predominating neurosis that one is almost entitled to make a diagnosis of neurotic vomiting; he has little doubt "that the changed metabolism accompanying pregnancy, which may so easily become perverted, as shown by the tendency towards acetonuria . . . is the underlying cause of all cases of vomiting of pregnancy." The best method so far available to restore the patient to a normal metabolism is said to be insulin and glucose. The value of complete isolation of the patient and of suggestion in these cases is stressed, and also the need for combating dehydration, if necessary by subcutaneous injection. The author proceeds to deal with the "low reserve kidney," a term first introduced by Stander and Peckham. This condition is ascribed to toxæmia, and is associated with a mild degree of hypertension, albuminuria, and œdema; it is difficult to see in what respect it differs from a mild form of the "pregnancy kidney" familiar to us all. The "low reserve kidney" invariably clears up after delivery; it may recur in successive pregnancies, but never in a more severe form or at an earlier period of the pregnancy—in short, permanent kidney damage is never sustained. Prof. Stander gives a helpful and comprehensive review of the various tests of kidney function. He believes that the urea-concentration test, as modified by Rabinowitch, will prove the most useful test in diagnosis and prognosis. He strongly advocates the termination of pregnancy in all cases complicated by chronic nephritis, unless decided and rapid improvement follows rest in bed with restricted low protein diet and plenty of fluid. If there is much œdema a salt-free diet is advocated. Forty pages are devoted to a discussion of the causation of eclampsia. Prof. Stander comments on the increased lactic acid in the blood in eclampsia, and considers the phenomenon of decreased or deficient oxidation "the most fundamental finding yet discovered in eclampsia." In treatment he advocates conservative tactics and describes the modified Stroganoff method now in use at Johns Hopkins. Venesection finds no favour, since high blood pressure may be a protective mechanism leading to increased elimination; but, if used at all, large quantities should be withdrawn (750–1000 c.cm.).

with the object of removing toxins. Radical interference should be practised, preferably under spinal or local anæsthesia, only if, in spite of conservative treatment, the patient becomes progressively worse. It is disappointing to find no reference to the remote prognosis of albuminuria and eclampsia; this should have attention in future editions.

The volume is a concise and reliable statement of the present position of our knowledge of the toxæmias of pregnancy, and deserves to be widely read. A bibliography containing over 700 references to literature is appended.

THE EXPECTANT MOTHER AND HER BABY.

By BODH RAJ CHOPRA, M.B., Ch.B. Edin. Edinburgh: W. Green and Son, Ltd. 1929. Pp. 148. 8*s*. 6*d*.

THIS book is apparently intended for circulation in India. It is divided into two parts which are unequal both in length and in quality. The second and larger part on the care of the child is so good that the defects of the brief section into which advice to the expectant mother is compressed are regrettable. Examples of assertions to which we take exception may be quoted. Under the heading "Mental Discipline," it is stated that "the mind of the parents, both generally and at the time of procreation, and also the subjects constantly heard by the mother during the period of pregnancy, influence the form, the attributes, and even the complexion of the child." We are told that the custom "prevalent among European nations" of spending the honeymoon in "places of natural charm" is designed to make the mother bring forth an "ideal offspring." The method of preparation of the nipples by hardening with eau-de-Cologne and spirits finds little favour amongst obstetricians in this country. Only 24 pages of the book are devoted to advice to the expectant mother regarding the care of her own health, and no counsel is given regarding the importance of such warning symptoms as hæmorrhage in late pregnancy, headache, visual disturbances, scanty urine, or œdema. These are serious omissions. Fourteen pages are devoted to "directions for the attendant" on the conduct of labour and care of the newly born child. This section is elementary, and is evidently intended for women with little training; for these it would be useful enough, although we deprecate the practice, in this country happily becoming extinct, of putting the forefinger into the baby's mouth in order to remove mucus. In the instructions regarding the care of the baby's eyes no mention is made of the prophylactic use of silver nitrate solution. The attendant is advised to bathe the eyes with boracic solution, and when inflammation sets in to send for a doctor.

The greater part of the book is given up to the feeding of the infant, artificial feeding, hygiene of infancy, the normal growth and development of the baby, ailments, and infectious diseases, with a final chapter on the mentally deficient child. This part is exceedingly well written. The advice given is sound and is expressed in concise and simple language. Much of it reflects the teaching of the late John Thomson, of Edinburgh, to whom the author expresses his indebtedness. If in future editions the first part of the book can be brought to the level of the last eight chapters, it should become a popular text-book.

GASES AND LIQUIDS.

By J. S. HALDANE, C.H., M.D., F.R.S., Fellow of New College, Oxford; Director of the Mining Research Laboratory, and Hon. Professor, University of Birmingham. London and Edinburgh: Oliver and Boyd. Pp. 331. 18*s*.

THIS contribution to molecular physics takes the reader into such various fields as the dynamical theory of gases and heat, gaseous diffusion, osmosis, the depression of freezing points of solutions, the internal pressure of liquids, and finally the steam engine and some other heat engines. The book is stimulating since it is the result of individual thought on the part of the author, who is vigorous in denouncing what he holds to be fallacious teaching in the realm of thermodynamics. It is possible that he is unfair to pioneers of the stamp of Clausius, Kelvin, and Clerk Maxwell. Their generalisations may well have been made with the mental reservation that their theories still left many phenomena unexplained.

A TEXT-BOOK OF PHARMACOLOGY AND THERAPEUTICS.

By HUGH ALISTER MCGUIGAN, Ph.D., M.D., Professor of Pharmacology and Therapeutics, University of Illinois College of Medicine. London and Philadelphia: W. B. Saunders Company, Ltd. Pp. 660. 28*s*.

IF we are to judge from the quotations in the preface of this book Prof. McGuigan has a profound belief in the necessity of the closest alliance between theory and practice, and with that in view he has attempted to correlate the facts of physiology, biochemistry, and pharmacology with clinical application. He has achieved only a fair measure of success, partly perhaps because he has undertaken a difficult and complex task; but mainly, we think, because of the unsystematic arrangement he has adopted in dealing with special pharmacology. The book breaks no new ground. It follows the general plan of most of the standard works on pharmacology and therapeutics, each drug being taken seriatim, its chemical characteristics described, its pharmacological action discussed, and its therapeutic uses mentioned. The information offered, particularly on the pharmacological aspect, is extensive, accurate, and up to date, and the introduction deals in a specially interesting way with the modes of action and the absorption of drugs. A number of excellent diagrams which have been reprinted from the author's well-known work on experimental pharmacology illustrate the seat and nature of action of important drugs. The book contains also a chapter on the pharmacological action of immune serums and notes on the pharmacopœial preparations and prescription writing. It fails only when it is judged on the standard of the author's own high ideals for such a text-book, and is at least as useful an adjunct to clinical work as are most other clear accounts of modern pharmacology.

PHYSIOTHERAPY.

Theory and Clinical Application. Second edition. By HARRY EATON STEWART, M.D., Director of the New Haven School of Physiotherapy. London: Humphrey Milford, Oxford University Press. 1929. Pp. 395. 34*s*.

THIS second edition of Dr. Stewart's book has the same general arrangement as its predecessor. It is divided into two main parts. In the first the author describes the nature, mode of action, and properties of the physical agents used in the treatment of disease. Electrotherapy, phototherapy, ultra-violet ray therapy, hydrotherapy, massage, remedial exercises, and muscle-training are considered in turn. The second part deals with the clinical aspects of physiotherapy. Dr. Stewart recommends the form or forms of physical treatment which are likely to produce benefit in different diseases, and describes the technique of their administration. The book concludes with suggestions for the treatment of miscellaneous maladies, postural defects, and some foot disabilities. The author deals with all forms of physiotherapy (excepting X rays), and as he has had considerable experience he is able to give impartial advice in the selection of appropriate methods. The perplexity of the beginner who has studied different branches of physiotherapy in separate books, and finds overlapping of the therapeutic fields mapped out for each kind of treatment, will thus be solved, and for this reason alone the book can be recommended. But there are other good grounds for reading it. For example, Dr. Stewart is a protagonist of the treatment of lobar pneumonia by

diathermy, and has here summarised his experience in a convincing way.

In the pages dealing with high-frequency currents Dr. Stewart points out that there is risk in subjecting the brain to diathermy. Some patients have suddenly lost consciousness during the treatment without showing any premonitory symptoms. In the chapter on Exercise he speaks with authority of the value of athletics for the adolescent female, for he has been athletic director to secondary school girls and instructor in a normal school of physical education, and, later, physician and head coach to the American team at the first international track and field contest for women held in Paris in 1922. In his view the drastic change that has taken place in the physical life of the American girl during the last two decades has led to no harm and to much good, though he stresses the need for care in preliminary medical examinations and for competent supervision. He states that carefully followed up records of graduates of normal schools of physical training have shown menstrual and maternal histories better than those of the average woman.

Dr. Stewart's book can be confidently recommended to the student and practitioner of physiotherapy. It furnishes the reader with the American point of view of the subject, and at the same time gives adequate reference and credit to the work of European investigators.

THE TREATMENT OF CATARACT AND SOME OTHER COMMON OCULAR AFFECTIONS.

By Lieut.-Colonel HENRY SMITH, C.I.E., B.A., M.D., M.Ch., Indian Medical Service (retired) (London). With the collaboration of Lieut.-Colonel A. E. J. LISTER, F.R.C.S., I.M.S. (retired) (London), Dr. ARNOLD KNAPP (New York), and Dr. J. RUSSELL SMITH (London). Illustrations by Dr. DERRICK T. VAIL, University of Cincinnatti, and Dr. J. RUSSELL SMITH (London). Calcutta: Butterworth and Co. (India), Ltd. Pp. 287. 15*s.* 6*d.*

IN 1910 Lieut.-Colonel Henry Smith wrote a book on the treatment of cataract published by Messrs. Thacker, Spink and Co. We welcomed its appearance, since it enabled us to obtain a clear conception of the author's attitude to the classical method of extraction of cataract, as well as a detailed account of the intracapsular method which has been so successful in his hands and in those of his disciples. Colonel Smith has now entirely rewritten the monograph, which in its present form is published by Messrs. Butterworth and Co. Those ophthalmologists who wish to study the latest improvements devised by the author for his operation will find them described and clearly illustrated by numerous diagrams on pages 102 to 123. Colonel Smith believes that the new technique will put his original method into disuse. He claims, moreover, that the obstacle which in the past "quite rightly prevented the profession in the West from adopting it—that with its more limited opportunities for acquiring the necessary technical skill there was no method at its disposal from which it could hope to obtain success"—is now removed. The operation recommended has been reduced to a simplicity which, its originator believes, should enable it to be performed in relatively unskilled hands, not merely with a lower incidence of loss of vitreous than the capsulotomy operation when in the latter an adequate attempt is made to clear the eye of cortical lens matter, but even without that rupture of the hyaloid membrane which is a result of interfering with an after-cataract.

An interesting note on the historical aspect of the surgical treatment of cataract is included in the book, with a short account of lens couching as performed by the "rawals," a hereditary caste which originally sprang from a group of villages in the Punjab. A final chapter is devoted to the treatment of glaucoma and some other common ocular affections, and contains useful hints.

THE FRENCH MEDICAL ANNUAL, *L'Année Médicale Pratique* (Paris: René Lépine. 1929. Pp. 621), appearing for its eighth year under the skilful editorship of Dr. Camille Lian, is well up to standard. This volume contains an adequate summary of the principal contributions to French medicine during the past year, and gives an interesting idea of the trend of continental opinion. The growing importance of all forms of radiotherapy is obvious in many sections; an able description is given by the editor of the treatment of angina pectoris by this means. The treatment of various forms of anæmia by liver diet or extract receives due notice, and an interesting account of the epidemic of dengue which raged in Athens during the summer of 1928 is included.

JOURNALS.

BRITISH JOURNAL OF CHILDREN'S DISEASES. Vol. XXVI. July-September.—Dr. Fergus R. Ferguson and Dr. Macdonald Critchley contribute the first part of a paper, entitled A Clinical Study of Congenital Neurosyphilis, based on the records of cases at the National Hospital, Queen-square, during the last decade. The cases consisted of congenital G.P.I., congenital tabo-paresis, congenital tabes, and a heterogeneous group which included epileptiform convulsions, mental defect, meningitis, hydrocephalus, cranial nerve palsies, paralysis of the extremities, and examples of the so-called nervous child.—In a paper on the Nervous Complications of Whooping-cough, Dr. W. Gordon Sears reviews the literature and records three personal cases. He suggests the following classification: 1 (*a*) Convulsions and coma; (*b*) spasm of the glottis. 2. Paralysis: (*a*) cerebral type; (*b*) spinal type. 3. Meningeal syndrome and meningo-encephalitis. 4. Peripheral neuritis. 5. Mental and other nervous changes, including hysteria, hypochondria, melancholia, epilepsy, and dementia. Sears comes to the conclusion that the primary cause in all these types of nervous complications is toxic, and that a meningo-encephalitis is the primary lesion.—Dr. N. Gray Hill contributes a paper on Herpes and Varicella based on the study of cases of these two diseases at Queen Mary's Hospital for Children, Carshalton, since May, 1926. His conclusions are as follows: 1. Herpes zoster is an infectious disease, and persons suffering from it should be isolated. 2. Herpes zoster may give rise to either varicella or herpes in susceptible persons. 3. The cutaneous lesions of herpes zoster and varicella are very similar. Investigation of the spinal cord should be made to determine whether there is a similarity in the cord lesions of the two diseases. 4. An attack of varicella confers no immunity against herpes zoster. 5. Further investigation is required to determine if an attack of herpes zoster will confer immunity against varicella.—In a paper entitled Tracheotomy and Tuberculosis Dr. J. D. Rolleston shows from a review of the literature and his personal experience that there is no justification for Landouzy's statement that children who have undergone tracheotomy for laryngeal diphtheria are specially susceptible to pulmonary tuberculosis and that very few reach adult life. On the other hand, hoarseness and liability to bronchitis are not infrequent sequelæ of tracheotomy.—In a note on the Nature of the Milroy-Nonne Disease, Dr. F. Parkes Weber shows that Nonne's cases of congenital and hereditary elephantiasis, published in 1891, were of the same nature as the cases of hereditary œdema reported by Milroy in 1892. Although no anatomical or histological study has yet been made, the cause of the condition is probably a lymphatic obstruction of some kind due to an antenatal or postnatal developmental abnormality of lymphatics and connective tissue. In support of this view is the occasional association with the œdema of other congenital defects such as spina bifida occulta, dental abnormalities, and congenital heart disease.—The abstracts from current literature are devoted to nervous and mental diseases.

THE LANCET.

LONDON: SATURDAY, SEPTEMBER 28, 1929.

THE TRAINING OF MIDWIVES.

THE report of the Departmental Committee appointed by the Ministry of Health in May of last year to consider the working of the Midwives Acts, 1902–26, will disappoint those who are more immediately concerned with the training of midwives for their practical duties than with the administrative control of their profession, or the adjustment of their place in a national maternity scheme. Less than a quarter of the report is, indeed, concerned with the training of midwives. The study of "conditions under which midwives are employed," which was included in the terms of reference, has proved so attractive that the Committee have made it the occasion for promulgating a scheme for a national maternity service, linked up with the National Health Insurance Acts. The scheme thus launched under official sanction bears a striking resemblance to that recently accepted by the representative meeting of the British Medical Association. We have already commented favourably on that scheme, and need now only record our fear that its proposals will attract public attention to the exclusion of the contributions which this report does in fact make to the difficult and complicated subject of the training of our midwives. This would be the more unfortunate, since the national scheme has allotted to practising midwives a rôle so important and so extensive that the question of their training and education becomes a matter of first importance to the State. The public will expect satisfactory assurances that the average midwife is really competent to discharge the grave responsibilities which will be placed upon her; the report assumes that nine-tenths of the half-million mothers who will come into the national scheme will be attended by midwives alone. The Committee do not express dissatisfaction with the present training of our midwives, or with the general standard of knowledge and efficiency which they attain on certification, though they do point out certain directions in which training could be improved. These are excellent as far as they go, and include (1) an entrance examination in reading, writing, and arithmetic, subjects in which it appears that a considerable proportion of our midwives are rather shaky; (2) a clinical examination before certification; (3) a post-certificate period of three months "hospital" experience, during which personal attendance on "at least five cases"—surely a very small number—is required; (3) post-graduate or "refresher" courses, at intervals, without expense to the practising midwife.

These changes, if they are carried out, will make no fundamental alteration in our present system of training. Under this system we take large numbers of almost uneducated women, who have had no training in general nursing, who are ignorant of the elementary facts of anatomy and physiology, and we attempt, in 12 months, to turn them into efficient midwives, to whose care the lives of our mothers may be entrusted. Where the raw material is sufficiently good, and where an intensive training can be given under the most skilled teachers, the task may be feasible; but only when clinical material is abundant. Unfortunately, however, the amount of clinical material available for teaching is woefully deficient, and in some of the largest institutions medical students and pupil midwives compete with one another for cases. Moreover, a considerable proportion of the cases available for pupil midwives are absorbed by those who do not intend to practise as midwives, but take the training because it is an essential qualification for the post of health visitor. The irony of the situation from the point of view of the midwife is that her work is liable to supervision by these very health visitors, who have never practised midwifery, and have never gained the experience which, under our present system, can only be acquired after training. The Committee suggest no drastic alteration of this system, which they propose to leave practically as it stands. They must be aware that it compares unfavourably with the practice of other European countries which utilise the services of midwives. There are 193 independent "schools" for the training of midwives in England and Wales, varying greatly in size, while nothing approaching a common standard of organisation or efficiency exists among them. Some midwives are accordingly well trained, others badly. No solution is offered in the report to the problem of the supply of clinical material for the pupil midwife. In fact, the needs of the medical student are recognised to be so urgent that the Committee conclude that the training of pupil midwives in hospitals attached to medical schools must suffer some restrictions; they add "students in a medical school area should have preference in the apportionment of material, and . . . . pupil midwives in that area should be allowed to make use of such material only in so far as it is in excess of the needs of medical students." If this recommendation is adopted, as on other grounds we trust it will be, the opportunities for pupil midwives to handle cases in hospitals attached to medical schools will greatly diminish. The fact that "the midwife occupies an exceptionally responsible position . . . . compared with women employed in allied branches of nursing" is admitted by the Committee, who, nevertheless, believe that the time has not yet come either to increase the length of the midwife's special training or to require a preliminary training or experience in general nursing.

It is clear that the opportunities and emoluments at present offered by the profession are not likely to attract highly educated women to its ranks, or to encourage others to undergo a long and arduous period of training to fit themselves for its practice. Moreover, fundamental alterations in an established system cannot be made in a day, but the Committee have missed a great opportunity of pointing out the directions in which the evolution of the midwife's training should be led, and the ideals which should be kept in view. The chief ideal is to provide for the country a body of midwives worthy to form the basis of a national scheme, composed of educated and highly trained women, animated by the esprit de corps of an honourable profession, and adequately remunerated for their work. Only in proportion as some

such ideal as this is attained will a national scheme yield the expected result. One step towards this end would be to give midwives a larger share in the management of their own profession, thus developing their sense of responsibility and of the dignity of their work. The administrative changes proposed in the report tend, however, in the opposite direction. Generally speaking, the changes would place the midwives' profession under the control of medical officers of health and nominees of the Ministry, to the practical exclusion of practising midwives and teachers of obstetrics. The most alarming of the administrative changes proposed are indeed those aimed at the weakening of the Central Midwives Board. The main objections to these proposals are clearly set out in the Memorandum of Reservation, signed by Mrs. BRUCE RICHMOND and Dr. J. S. FAIRBAIRN. We trust that this memorandum will be carefully considered before any decision is taken to limit the scope of a body which has done invaluable public service in the past, and which, if it were made more fully representative and given wider powers, would be in a position to do still more useful work in the future.

DYSENTERY IN GREAT BRITAIN.

DYSENTERY has left a trail of suffering and death all down the ages and still stands supreme as a scourge of armies and camps. A disease which, given suitable circumstances, will so rapidly break out in formidable epidemics, must necessarily have ways of subsisting when times are bad for it—unless we are to believe in spontaneous generation or in gross mutations whereby saprophytes suddenly acquire pathogenic properties together with an array of associated and distinguishing characters. If we follow orthodoxy and disallow such fascinating speculation it follows that the infecting organism must be kept alive in the lean years by a persistence in the carrier state or by a continuous though unobtrusive chain of endemic infections. The evidence for a true carrier state in bacillary dysentery is on the whole negative, and we are left with endemicity as the means by which the causal organism of this disease survives. It is common knowledge that asylums have long been depots of dysenteric infection—a state of affairs which is being coped with successfully by modern energetic measures inspired by a fuller comprehension of the problem. But apart from these, sporadic cases of dysentery and "ulcerative colitis" are far from uncommon in this country and the probability is now almost a certainty that the disease is endemic in many centres; masked, slumbering, and often unheeded, but none the less there. The bacillus survives and only the excellence of our hygienic equipment keeps it under control. In many parts of the Continent, and especially during military manœuvres and in barracks, the disease is a very much more serious menace than it is in Great Britain.

In our last issue (p. 626) we published an article in which Dr. J. A. CHARLES and Dr. S. M. WARREN drew attention to a series of cases of dysentery in Newcastle-upon-Tyne. Their well-documented paper gives a full account of a quasi-epidemic outbreak of this disease in a city where, as Dr. CHARLES has previously shown[1] there is every reason to believe that it has been endemic for a very long time. Evidence of the kind here adduced makes one suspect that where dysentery has passed out of notice the reason is more likely to be found in a change of nosological fashion than in bacillary inactivity. If the writers of this paper may possibly be accused of a little exaggerating the lack of recognition accorded to the disease in this country—where almost every hospital bacteriologist certainly sees some cases in the course of the year—their criticism of current opinion is nevertheless well founded and they must be congratulated upon the thoroughness with which they have studied an unusually large and significant series of cases. These include 141 examples of proved bacillary dysentery observed between March 1928, and the end of June, 1929, most of them occurring in children between the age of two and the earlier years of school life. A considerably larger number of cases were encountered in which there was good reason to suspect bacillary dysentery but in which bacteriological proof was not obtained. Two types of case were met with: a mild form in which the patient recovered, and a fulminant form which proved fatal within 18 to 24 hours. The deaths, ten in all, were all in cases falling into the second of these categories.

The pathology of bacillary dysentery varies with the type of infecting organism and the acuteness of the disease. In fulminating cases in children the condition is pre-eminently an acute toxæmia and the lesions in the intestine are only trivial; in fact the rapidity of the process almost precludes their development. In adults, fatal cases, which are not common in this country, are most often of the Shiga type in which, if the acute phase is survived, death occurs at the end of an exhausting illness, the patient dying with widespread necrosis of the mucosa of the lower bowel, which is sometimes uniformly involved from the ileocæcal valve to the anus. Such infections are, however, comparatively rare and dysentery as now seen in Britain is usually of the milder Flexner, or the more recently described Sonne, types. There is a good deal of rather confusing detail in the descriptions of serological races of dysentery bacilli, but these are the main indigenous types, and they contributed to CHARLES and WARREN'S cases in the proportions of about 4 to 1, with a negligible number of cases due to other types. The Sonne bacillus was found to be somewhat less toxic than the Flexner organism; but the latter, though less virulent for adults than Shiga's bacillus, which is rarely encountered here, may cause a very dangerous infection in children. It is a somewhat curious and unexplained fact that in the series of cases we are considering the mortality was highest not in the very young children, but in boys of 5 to 15 years. In general the mortality was low (7 per cent.) in the proved cases, and this figure no doubt exaggerates the gravity of the infection, since it does not take cognisance of the many mild cases which escaped exact bacteriological diagnosis. It may be worth repeating that all cases other than the fulminating ones recovered; the forms of treatment relied on were salines and serum, and the much discussed bacteriophage was not administered. As regards the fatal cases it is of importance to note that the symptoms of acute fulminating dysentery in the child are sickness, fever, drowsiness, toxæmia, coma, death. The short drama is quickly over and the full intestinal syndrome may never be developed It is well that this should be widely recognised and that the necessity of expert pathological and bacteriological investigation of all cases of dysenteric infection should be emphasised. The organism is amongst us, and it is a duty to the public and to ourselves to keep tally of it as closely as we may, whilst working steadily towards its elimination.

[1] THE LANCET, 1928, ii., 616.

THE CORONER'S AUTHORITY.

HAS a coroner too much power? Some may think so who are accustomed to other forms of judicial tribunal. Two solicitors, attending an inquest lately held at Bournemouth, may have been surprised when the borough coroner refused to allow them to cross-examine witnesses on behalf of parties concerned. The coroner was exercising an indisputable right; he is not only judge but also, so to speak, examining magistrate. He summons such witnesses as he thinks fit and, if he chooses, he can insist on questioning them himself. During the course of the proceedings it may happen to become clear that blame attaches to A or B in respect of the death of X; but A and B have no inherent right to make their defence in the coroner's court; they may even be found guilty of wilful murder on the verdict of the coroner's jury though they have neither been present in court nor been represented by any legal adviser. That is the chief anomaly of the inquest as a judicial tribunal.

The essential element in the proceedings is a dead body, not a specific charge against a named person. The coroner is engaged in collecting and sifting the evidence as a preliminary step to the framing of a charge. Hearsay and gossip are not to be ignored if they help him to reach the facts, nor are the technical rules of evidence to be rigidly followed. His inquiry being of a roving nature, the jury may be invited to range over topics of general interest rather than of strict relevance to the limited issue. Thus at a recent inquest upon the death of a patient in a mental hospital the coroner is reported to have said that it would be for the jury to say whether the hours worked by the hospital staff were not too long. If this meant that the death amounted to manslaughter, caused by the criminal negligence of the hospital management or personnel, it was correctly referred to the jury's arbitrament. If it merely meant that the jury should comment upon the hospital administration, it was one of the vagaries tolerated and encouraged in coroner's courts and in no other judicial tribunals. Anyone who made a collection of the riders attached to the verdicts of coroner's juries would obtain specimens of remarkable range. He would probably also detect similarities in the riders presented to a particular coroner. Sometimes a coroner has views of his own which he does not attempt to hide. Junior barristers, it is believed, when sent to attend an inquest professionally, are occasionally instructed by their more experienced seniors in these idiosyncrasies. The particular topic is respectfully kept in the foreground and the jury adds the appropriate rider.

In view of its autocratic character, the coroner's authority is happy in escaping adverse comment. An independent observer may sometimes be shocked at what he deems the unnecessary publicity and probing into personal affairs in cases of obvious suicide. The legal profession may raise its eyebrows at "coroners' quest law." The general public may wonder whether the inquest should not be brought more closely into line with our other judicial courts. But the inquest is an ancient institution; therefore it is popularly acceptable. The machinery works; therefore time need not be wasted in the invention of a theoretically more perfect process. The statute law was reviewed and amended only three years ago; therefore it is likely to be left untouched for another generation. The ample discretion entrusted to the coroner is not abused by coroners of discretion.

Annotations.

"Ne quid nimis."

NEGLECT OF THE DEAF.

THE National Institute for the Deaf, in its fifth annual report, has endeavoured for the first time in the social history of this country to place before the public in a concise form the full case of the deaf-mute and the deafened. It is evident that the Institute is doing a large amount of valuable work in the face of the severe handicap resulting from lack of interest and support, both from the public and from the Government. Deafness is the most widespread of all sensory disabilities, for the number whom it afflicts in this country probably reaches several millions. It is, therefore, surprising that the total contributions to organisations labouring for the welfare of the deaf and dumb and the deafened over school age should amount only to something under £40,000, while the State stands entirely aloof from such work. In contrast, more than ten times this sum is voluntarily contributed annually for the blind, whose total registered numbers are only some 46,000, while rates and taxes provide a further £600,000. Again, for the blind, the qualification for Old Age Pensions, already reduced to 50 years, will shortly be lowered to 40, but no such consideration is shown to the deaf. At present, education is the only service publicly provided for the deaf, but the Committee of the Institute believes it is certain that the majority of deaf children, despite their far greater need, do not receive an educational opportunity equal to that which is rigidly required for children who can hear. Further, the Committee has recently concluded an inquiry into the industrial position of the deaf and dumb, and has no hesitation in saying that the effects of the large expenditure on education have been, to a great extent, neutralised by the circumstances of post-school life. This is not the result of any lack of effort on the part of the schools or the welfare societies, but is due to the inevitable handicap of deafness in working life, which is increased by modern conditions of industry, by certain legislation affecting wages and insurance schemes, and by the regulations of trade bodies in several industries. As a result, 30 to 50 per cent. of deaf school-leavers remain unemployed. This industrial problem is a pressing one, and it is much to be regretted that the Government in 1928 refused to make any inquiry into the matter. The Institute is raising this question again, and regards it as urgent that an adequate and searching inquiry into the full conditions of the deaf and dumb and the deafened over school age shall be made by the Government in the near future. It is much to be hoped that the Institute will receive the general public support which it deserves.

DIAGNOSIS AND CURE OF G.P.I.

THIRTY years ago general paralysis of the insane was regarded as a definite clinical entity for which there was no cure. It was generally held to be a kind of cerebral exhaustion, due to excessive expenditure of vital energy on "woman and wine." While the diagnosis offered no great difficulty to the experienced alienist, it was made very cautiously, because the outlook was hopeless. The part played by syphilis was subsequently proved beyond reasonable doubt by Noguchi's demonstration of the spirochæte in paralytic brains, and since then the tendency has been to make diagnosis depend on complex laboratory tests for syphilis rather than on observation of the patient's demeanour. The possibility of cure by anti-syphilitic remedies, and recently by induced malarial pyrexia, stimulated efforts at early diagnosis, and thus led to a still greater tendency to diagnose on laboratory findings without waiting for the development of late and unmistakable mental and physical signs. The

Board of Control, having carefully investigated the results of five years of malarial therapy, is satisfied that lengthy remissions, tantamount to cure, have resulted in a goodly proportion of cases, and has definitely pronounced in favour of the method.[1] Malaria is being used more and more, and earlier and earlier; indeed, Dr. G. W. B. James has suggested that it may soon become as essential to do a lumbar puncture, if there is a single sign or symptom suggesting general paralysis, as to take an X ray photograph in a case of injury. But this apparently smooth progress of a new treatment towards universal recognition was interrupted some months ago by a challenge from Dr. John Brander,[2] who roundly questioned the validity of modern diagnosis, and—at the same time—of alleged success in treatment. He believes that serological methods have brought confusion rather than aid to the diagnosis of cerebral syphilis, and that many cases of syphilitic pseudo-paralysis or "insanity with gross brain lesion" are now classed as general paralytics. These, and not cases which would have been so diagnosed by the clinicians of 30 years ago, are the patients who respond to modern therapeutic methods. General paralysis, on the original criteria, is as incurable as ever it was.

To meet this challenge and debate the whole subject the Royal Medico-Psychological Association held a special discussion, and the report of it which has just appeared [3] reveals variety of opinion on almost every point; even the name of the disease is not generally accepted. Dr. Glen Duncan thought that to label any cases "general paralysis of the insane" hampered both psychiatric investigations in general and treatment of individuals, while Dr. James supported Sir James Purves-Stewart's suggestion of the term "progressive syphilitic meningo-encephalitis." The pathology is equally uncertain. While Dr. Nathan Raw's dictum, "no syphilis, no general paralysis" met with general agreement, the theory of the neurotropic stain of spirochæte was not looked upon favourably, Dr. W. A. Caldwell suggesting that the difference in the effects of syphilis depended rather on differences in the soil. Dr. Alexander Walk quoted the French view that ordinary forms of syphilis are allergic, while general paralysis, aortitis, and lingual leucoplakia are anallergic. Dr. B. H. Shaw thought that alcoholism might be the factor which determined whether or not a syphilitic would become a paralytic, while to Dr. F. A. Pickworth the long delay between syphilitic infection and the onset of general paralysis suggested the possible significance of sepsis—e.g., intestinal infection and sphenoidal sinusitis. On the subject of diagnosis there were as many different opinions as there were speakers. Prof. G. M. Robertson thought that no human disease could be diagnosed with such certainty, and based his assurance on a consensus of mental symptoms, physical signs, and laboratory findings. Dr. Hamilton Marr regarded it as a most difficult condition to diagnose, and believed that nine out of ten cases called "general paralysis" during the war were pseudo-paralysis. Prof. J. Shaw Bolton agreed, and pointed out how readily these cases had remitted and how well they had responded to treatment with arsenic and mercury. To some psychiatrists laboratory tests seemed quite unreliable, while others had confidence in some one test, and regarded the remainder with suspicion. Dr. R. M. Stewart had found no one test diagnostic, while Dr. T. S. Good often made his diagnosis on the examination of the cerebro-spinal fluid alone; Dr. Hamilton Marr believed that the colloidal gold test is the most reliable. Dr. Walk did not think there was any tendency nowadays to place too much reliance on laboratory findings; if clinical and laboratory observations could not be correlated, the tendency was to give the clinical side the predominance. Prof. Shaw Bolton laid stress on the existence of a certain degree of confusion of the well-known type as the only reliable mental sign. In the absence of this confusion the prognosis was fairly hopeful, and the disease might remit under any one of several kinds of treatment. Equally varied were the views on treatment. The advocates of malarial therapy pointed to their percentage of remissions. Dr. W. F. Menzies asked whether in the old days, eight successive cases had ever been known to improve, whether treated or not. Dr. B. H. Shaw imagined a history written in A.D. 2500 which dismissed malarial therapy as an amazing and almost incomprehensible obsession. Tryparsamide had its advocates, and in the opinion of Prof. Shaw Bolton had partly justified its claim as a spirochæticide. Between the advocates of malarial treatment there was a difference of opinion on the relative values of the "mosquito" and "blood" methods.

The reader of the report may well agree with Dr. G. Rudolf, as summarised by the President: "that it was impossible to explain the differences in the results obtained by different observers, and that a careful study of the subject made him satisfied that the fallacies were so numerous that nothing definite followed at all." Yet early diagnosis is of the greatest importance if early treatment offers the slightest prospect of cure. As Dr. A. A. Petrie observed, malaria is a dangerous treatment, and its employment is justified only in cases with a very grave prognosis. On the other hand, true general paralysis is such a terrible condition that any alleviating measure ought to be employed at the earliest possible moment. The Royal Medico-Psychological Association has appointed a special subcommittee to consider the treatment of general paralysis, and everyone will hope that this body may be able to reconcile opposing views.

[1] See THE LANCET, August 24th, p. 402.
[2] Ibid., 1929, i., 391.
[3] Published by Adlard and Son, Ltd., 21, Hart-street, W.C. 1929. Pp. 56. 1s.

THE INCIDENCE OF VASCULAR SYPHILIS.

NEW interest has been awakened in the pathology and treatment of syphilis by the important discussion upon this subject at Manchester in July.[1] The main points discussed at that meeting were the effects of syphilis upon the cardiovascular system, and there is no doubt that our knowledge concerning these lesions has greatly altered and increased in recent years. We have thus come to realise that syphilitic aortitis is far more common than was previously suspected, and have learnt to diagnose this condition with greater certainty than was formerly possible. In a review[2] of this subject Dr. Bergel and Dr. Rosenthal of Berlin have summarised modern views on the individual incidence of the various forms of syphilis and upon the all-important question of their curability. Collected statistics which they report from Germany covering approximately 70,000 autopsies show that more than 80 per cent. of the syphilitic patients presented involvement of the vessels, and particularly of the aorta. Most clinicians have noted that aortitis is more frequently present in association with tabes or general paralysis than formerly. Rosenthal as a result of careful investigation has no doubt that both syphilitic aortitis and aneurysm have markedly increased among women as well as among men in recent years. He believes, moreover, that the time interval elapsing between primary infection and the first evidence of aortic involvement has strikingly diminished. The cause for such variations in the character of syphilitic infection is not easy to determine. The suggestion that modern salvarsan treatment has tended to alter the disease in the direction of lessening skin affections and increasing nervous and vascular manifestations is supported by some neurologists, but it is clearly a problem that must depend largely upon the exact nature of the treatment employed, and upon the stage of the disease at which it was begun. The fact that both vascular and nervous lesions are now diagnosed at an earlier stage must also be remembered, though in post-mortem material this consideration does not, of

[1] See THE LANCET, August 17th, p. 330.
[2] Bergel, S., and Rosenthal, O.: Med. Klin., 1929, vol. xxv., Suppl. 6.

course, arise. Prof. Warthin, in his opening paper at the Manchester meeting, stated that latent active lesions are found in the aorta of *every* male syphilitic and in the majority of female syphilitics. Clinically the diagnosis is far less common than this statement would suggest. The Wassermann reaction is not always positive in aortic lesions, nor may the signs and symptoms be at all distinctive. Præcordial pain, not necessarily amounting to angina, discomfort or oppression over the sternum, a systolic murmur with a ringing aortic second sound but without a raised blood pressure, and X ray evidence of aortic dilatation are our best guides to diagnosis. In the presence of aortic regurgitation or actual aneurysm the difficulties are naturally less, and most clinicians would agree that the presence of an aortic aneurysm is more certain evidence of syphilitic infection than is a positive W.R. in the blood.

Such high incidence of vascular lesions suggests a reconsideration yet again of the curability of syphilis, and the results of treatment as far as they are apparent to-day. There is general agreement that aortitis itself cannot be completely cured, and there is unfortunately no evidence that arsenical preparations have in any way reduced its incidence or mortality. Warthin remarks that he has never seen at autopsy a case of perfectly healed syphilis, and that search always reveals active latent lesions in aorta, heart, or other organ. Bergel concludes that syphilis is probably curable only in the first or sero-negative stage, after which true healing is unlikely ; and that even with our present methods, though salvarsan is a most potent remedy, actual cure can never be established with any certainty. Even if recovery does take place, Bergel believes that no lasting immunity is conferred and reinfection may thus occasionally occur. It is clear that if this pessimistic attitude is accepted, our sole hope of treatment must lie in early antisyphilitic measures, which must be instituted in the stage of the disease in which the W.R. is still negative. Even at this time, however, a satisfactory percentage of cures can hardly be expected unless at least two full courses of combined arsenobenzol and mercury or bismuth treatment are administered. Such abortive treatment in good hands gives, according to different authors, complete success in between 76 and 100 per cent. of cases, though to a given patient it is never possible to make an absolutely certain reply to his question "am I permanently cured?" Dr. T. E. Osmond, who reviews in this issue the significance of the W.R. at various stages of the disease, states that a case in which treatment is started at the early primary stage will almost invariably continue to give a negative W.R. if the reaction has been negative for a period of one year. Patients beginning treatment at a late primary or a secondary stage may relapse even after giving a negative reaction for two years. It is clear that, as was emphasised by the openers of the discussion at Manchester, the true treatment of cardiac syphilis must be preventive.

NON-OPERATIVE TREATMENT OF SQUINT.

THE main object in the treatment of commencing squint in young children is, of course, to prevent amblyopia in the squinting eye. In the great majority of children Nature provides a safeguard against squint by the development of the impulse to fuse the slightly different images on the two retinæ so as to produce binocular perception. In certain individuals, however, this power of fusion is weak or develops late, and it may even be altogether absent. These are the children who are likely to develop a squint if other factors in the causation of that condition, such as hypermetropia, are present ; if the squint is confined to one eye, and is constant, the tendency is for the child to suppress the image formed by the squinting eye. In young children the eye soon becomes amblyopic in the absence of treatment ; when the onset of squint is deferred till the child is older the degree of amblyopia is less pronounced, but the longer it has persisted the more difficult it is to overcome. C. A. Worth found [1] that of 193 cases which were brought to him when the duration of the squint was only one-eighth of the life of the patient he was successful in preventing any degree of amblyopia in 165. In cases where the duration had been more than one-eighth but less than one-half of the patient's life, the corresponding cases of complete prevention were 73 out of 188, and in the cases where the patient had squinted for more than half his life the complete cures were only 14 out of 604. Besides occlusion of the non-squinting eye the non-operative treatment of squint consists in the training of binocular vision and of the fusion sense. Hitherto this has generally been attempted by means of stereoscopic views and of the amblyoscope, by means of which the child is encouraged to combine the two images presented separately to the two eyes. In practice, however, it is difficult to keep the child's attention on the pictures, however childish these may be. It is to Dr. E. E. Maddox, the inventor of the "Maddox rod," that we owe a new principle in this sort of treatment. By means of his "cheiroscope" [2] the child's hands, as well as his fellow eye, are made to assist in the development of binocular vision. He can trace the outline of a picture visible to one eye only with a pencil visible to the other eye alone, or he can play a game of catching a butterfly visible to one eye alone with a net held in the hand of the other side and directed by the other eye. Such devices in the hands of properly trained guides are without doubt a great advance on previous methods. In certain cases they may even effect a complete cure of incipient squint and forestall the necessity of an operation. We understand that a new department at the Royal Westminster Ophthalmic Hospital is about to be equipped with the new apparatus, so that it will have every opportunity of an efficient trial.

TONSILLECTOMY AND PULMONARY ABSCESS.

TONSILLECTOMY is so common an operation that serious complications, even if they occur only in a small proportion of cases, may be responsible for a large amount of serious ill-health. Perhaps the most usual complication is some form of pulmonary inflammation, and the way in which this is produced has often been studied and discussed. Of two main schools of thought one maintains that infected material is inhaled at the time of operation, and the other that the pulmonary lesions are caused by the lodgment of emboli from the site of operation in the pulmonary vessels. The former theory is the more widely accepted, and finds further support in an investigation published in America by Harkavy.[3] He begins by pointing out that one of the reasons cited in favour of the embolic theory is that it is hard to produce inflammation in the lungs of experimental animals by introducing septic material into the bronchial tree, and then he goes on to describe his own experiments in this direction. Using dogs in which the recurrent laryngeal nerves had first been divided and which were anæsthetised by intraperitoneal injection, he introduced, through a cannula passed down a bronchoscope into the terminal branches of the bronchi, 0·5 c.cm of mixed cultures of bacteria along with fresh sputum, both derived from patients suffering from pulmonary abscess following tonsillectomy. Five out of 27 dogs so treated developed pulmonary suppuration. The fact that a patient suffers from chronic tonsillitis indicates that he has a low resistance to the particular organism present, and therefore one would expect his lungs to be abnormally vulnerable to infection by such organisms by whatever route they were introduced. The dogs had no such chronic focus of infection from which organisms might be introduced into their

[1] Squint, its Causes, Pathology, and Treatment, 5th edition, 1921.
[2] Made by C. W. Dixey and Son, 19, Old Bond-street, London, W. 1.
[3] Harkavy, J.: Arch. Int. Med., 1929, xliii., 767.

lungs, and their resistance might consequently be expected to be higher. This factor may account for the relatively small incidence of suppuration which followed the experiments. Harkavy has certainly shown that it is possible to produce suppuration in the lungs of dogs by direct inoculation with septic material, but it is hard to see how this knowledge will reduce the incidence of pulmonary complications following tonsillectomy. As it is, every possible precaution is taken by surgeons to prevent the inhalation of septic material during these operations, because they are confident, without the reassurance of experiment, that it is a real source of danger.

HOUSING IN THE IRISH FREE STATE.

A CENSUS was taken in the Irish Free State in 1926, and that section of the report which deals with the relation of population to housing was published last week. Accepting as the standard of overcrowding the fact of more than two people living in one room, it appears that in the whole country 781,000 persons, or 27·2 per cent. of the population, live in overcrowded conditions. The comparative percentages for Northern Ireland, Scotland, England, and Wales are respectively 18·1, 43·3, 9·8, and 7·2. The Irish Free State is thus shown to be in a better position than Scotland in this respect, but compares unfavourably with Northern Ireland, England, and Wales. The overcrowding in Ireland is worse in the rural areas than in the smaller towns, and among rural areas the worst are those along the western coast, particularly the counties of Donegal, Mayo, and Kerry. It is noteworthy, however, that this overcrowding in the rural areas does not express itself in a higher death-rate. Mayo, for example, with 41·7 per cent. overcrowding has a lower death-rate than the combined 24 best-housed urban districts with an overcrowding of 15·2 per cent. In urban areas there are other influences deleterious to health which more than counterbalance any advantage that may arise from better housing.

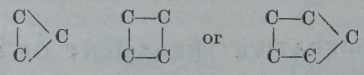
EMBOLECTOMY.

To those who cherish the belief that medical practice is international, at any rate on the surgical side, it must come as a surprise to discover that certain operations are frequently practised in some countries while they remain almost unknown in others. The operation of embolectomy illustrates this point. Were it an exceedingly technical and difficult operation, or were there grave reasons for regarding it as undeserving the serious attention of the practitioner, it would be easy to understand why its employment is geographically so patchy. More than 20 years ago Mr. Sampson Handley attempted the removal of an embolus lodged at the bifurcation of the abdominal aorta, and restored for a time the blood current in the femoral artery. He placed the case on record [1] as "one of those pioneer failures on which ultimate success so often rests." His report led Sir Berkeley Moynihan to mention [2] a case under his care at the Leeds Infirmary four years previously, in which an embolus was removed from the popliteal artery and the artery sutured; the patient, who had mitral disease and granular kidneys, died with extensive infarcts five days later. But this work does not seem to have been followed up, and for the most part it has been Scandinavian surgeons at home or in the United States who have taken the lead in this field of surgery. The names of Häggstrom, Key, Lundberg, and Michaëlsson appear in the literature of the subject, and in the public hospitals of Scandinavia this operation has been increasingly performed during the last ten years, the general practitioners in these countries being sufficiently cognisant of the indications for, and prospects of, embolectomy to send their patients to hospital as soon as the correct diagnosis has been made. In *Minnesota Medicine* for May, 1929, the Norwegian surgeon, F. H. Wiese, publishes a case of embolism of the right brachial artery in a woman, aged 64, suffering from heart disease. She awoke one morning with severe pain in the right arm, which was pale, cold, and paralysed. But she was not medically examined till between 6 and 7 P.M., nor was the operation, under local anæsthesia, started until 10.40 P.M., at least 14 hours after the onset of symptoms. Yet the operation was successful, relieving her of severe pain, restoring movement to the arm, and saving her from the gangrene which would eventually have developed, had the operation not been undertaken. Her death seven weeks after the operation from embolism elsewhere in the body, complicated by a three-day attack of pneumonia, emphasises the fairly common observation that this operation is in a certain sense only a palliative. But even then the operation may be justified, as it relieves pain, saves the patient from the much more serious operation of amputation for gangrene, and restores the use of the limb. Dr. Wiese's paper includes a useful summary of the literature.

[1] Brit. Med. Jour., 1907, ii., 712.
[2] Ibid., p. 826.

THE LATE PROF. W. H. PERKIN.

To many doctors the name of Perkin—especially in association with Kipping—will recall little more than a text-book on organic chemistry, which, in their student days, they were compelled, more or less unwillingly, to study. At that early stage of his career the medical student has little time, inclination, or knowledge to grasp the true significance of organic chemistry, and the important bearing which its methods have upon medicine. As the result of the introduction of the term biochemistry there is a tendency to overlook the fact that, without the preparatory work of the pure organic chemist, many of the outstanding achievements of biochemistry would still be in the realm of unsolved problems. The ability to establish the constitution of a complex carbon compound depends upon the skilful application of the methods of organic chemistry, and no sooner has the constitution of a physiologically important natural product been determined—be it hormone or alkaloid or what not—than attempts are made to synthesise it by those same methods. It is in this field of synthetic organic chemistry that the work of Prof. W. H. Perkin, who died last week, has been of such outstanding value. The son of Sir William Perkin, whose discovery of the first aniline dye from coal tar led to the foundation of the modern dye industry, Prof. Perkin was gifted with great technical skill and an amazing facility in overcoming experimental difficulties. He devoted most of his life to elucidating the constitution of some of the most complicated natural products and accomplished synthesis of many of them. At the beginning of his research career he set himself the problem of synthesising compounds containing three, four, or five membered carbon rings—



the possible existence of which was, at that time, scouted by such great organic chemists as Adolf von Bayer—his teacher, Victor Meyer, and Emil Fischer. In spite of this discouragement, which would have been sufficient to make other people hesitate, he persisted, and succeeded in producing such compounds. It would be impossible in small space to give an adequate account of Perkin's contributions to organic chemistry, but a few of his outstanding researches may be recalled, while he originally studied the synthesis of closed carbon chains for its own sake, the methods thus initiated came to be developed and applied to the synthesis of natural products; amongst these, the colourless precursors of the logwood dyes brazilin and hæmatoxylin claimed his attention, and resulted in his assigning to these substances their probable constitution. It is in the group of alkaloids, however, that in recent years he

has achieved his greatest success; his work on berberine and cryptopine extended over a number of years, and culminated in the establishment of the constitution of both of these compounds, and in the synthesis of cryptopine. Berberine, as its name implies, occurs in the root bark of the barberry, *Berberis vulgaris*, but is fairly widely distributed in the vegetable kingdom, occurring in plants belonging to the natural orders of Papaveraceæ, Ranunculaceæ, and Rutaceæ among others. Cryptopine, on the other hand, is a much rarer alkaloid, being obtained only from opium, where it occurs in the filtrate remaining after the removal of morphine and thebaine. Two other rather uncommon alkaloids, harmaline and harmine, occurring in the seeds of *Peganum harmala*, which have been used in the treatment of malaria, were also investigated by Perkin, and after showing them to be derived from hydroxytryptophane he succeeded in synthesising both of them. In 1910 he proposed a formula for strychnine which was generally accepted, and placed this compound among the derivatives of quinoline; but last year he put forward a modified formula according to which strychnine becomes a derivative of *iso*quinoline. This derivation would, of course, have a profound influence upon the course to be followed in its synthesis—an object which it was Perkin's great ambition to accomplish. Perkin's charm of manner and natural gift for imparting knowledge to others endeared him to all with whom he came into contact. His relations with his colleagues were always cordial, and he was generous in acknowledging the help he received from them. Fortunately for chemistry in this country he has left behind him a number of his former pupils, who are imbued with his spirit and can be relied upon to carry on his work in a worthy manner.

VENEREAL DISEASE ON THE CHINA STATION.

VENEREAL disease is a serious matter for the armed forces of the Powers in China, where it attacks at least three or four times as large a proportion of the men as at home. We know relatively little about what happens among troops other than our own, and a paper [1] by Dr. Cazeneuve, on cases of venereal disease among the French in 1927, is therefore instructive. He gives the percentage prevalence of these cases in the French Squadron in China for several years, and to this we have added the similar figures from the Royal Navy, though it may well be that the methods of enumeration are not precisely the same, and the figures not truly comparable. They are as follows:—

—	French Squadron.	British Squadron.	Army at Shanghai.
1900	13·7	18·3	—
1903	12	16·9	—
1907	15·3	18·3	—
1925	12·9	21·2	—
1926	16·7	17·4	—
1927	20·2	13·7	22·3
Number of men in 1927	1551	13,200	8,079

We may add the stated differentiation of cases (not first infections):—

Soft chancre	9·6	3·5	8·9
Gonorrhœa	8·1	8·4	11·6
Syphilis	2·5	1·8	1·6

Dr. Cazeneuve is concerned about the increase in venereal disease which he has observed during his service in China, and ascribes it primarily to the want of employment for men on leave and to the flooding of Chinese ports with prostitutes. Before 1911, he says, the Chinese kept their women away from the foreigner, but since the Revolution and the emancipation of women, excited young students, with "liberty" on their lips, are much in evidence, whilst the uneducated women of the poorer classes have adopted the new manners, and by reason of famine and poverty crowd into the foreign concessions. Japanese women have left China since 1914, but after the late war the Russians began to come down from Siberia, "many with no resources but their good looks"; they have had no one to take thought for them or look after them, and they it is who are the greatest danger to the sailor. Under these conditions venereal diseases themselves have become clinically more serious—a conclusion which Dr. Cazeneuve reaches because: (1) all three infections often result from a single risk; (2) some of the syphilitic cases are very severe; (3) chronic buboes follow 10 per cent. of the soft chancres; and (4) one-third of the hard chancres appear over the site of a soft chancre, suggesting simultaneous double infection. Much is done in the French Navy, he says, to prevent men from risking infection. Newcomers are warned, in classes of ten, that continence is the only true safeguard, and patients are enlisted as lay preachers in the same cause. Each man must take ashore the "nécessaire de poche" or prophylactic packet, but he is warned that these ointments protect less in China, where the disease is very infectious, than in Europe. Of 146 cases more than half professed they had availed themselves of the usual prophylactics, but of 233 who passed through the ablution chamber on board 75 per cent. escaped infection. Dr. Cazeneuve has great hope from the recreation room opened and the welfare work instituted for French sailors at Shanghai, though infections occur, of course, at other ports. Like many others he notes that the people who get themselves into trouble by indiscipline and carelessness on board are just those most liable to contract venereal disease ashore. What he says of the increase of prostitution in China is no doubt true, and when he says that venereal disease is there more severe than formerly he is in agreement with other writers; but it is to be noted that the time of each case under treatment and the proportional occurrence of all diseases but soft chancre have decreased in the Navy in the last four years reported (1924–27). This is probably due to the measures of welfare work he mentions, and to the accommodation of treatment to the local climatic conditions, but obviously it may be partly the result of special distribution of the ships in the various ports about the station, with a lessening of risk, for which no allowance can be made in the general statistics. That the figures are improving nevertheless raises our hopes that the toll taken by these serious diseases will further decrease, especially when medical officers have had time to study Dr. Cazeneuve's careful appreciation of the local situation.

[1] Arch. de Méd. Nav., 1929, cxviii., 43.

THE PHYSIOLOGY OF MILK PRODUCTION.

THE National Institute for Research in Dairying has for its chief aim the creation of a healthy industry, and in its early days the Institute at Reading demonstrated the losses occasioned by faulty milk and the methods to prevent these losses. This work has been of value to the Ministries of Health and of Agriculture, providing the former with the means of establishing standards of cleanliness for milk, and the latter with the basis of an educational campaign. Dairymen are now beginning to recognise that a cleaner milk is worth more money and are paying for it on a quality basis. The farmer is thus reaping the benefits to be derived from a healthy industry and the consumer is getting a sounder food-stuff. The same policy has been adopted towards the problem of milk carrying disease, particularly tuberculosis. The Institute has demonstrated the grave losses caused by bovine tuberculosis and has investigated the means by which it is spread in dairy herds, and the need for the more extended use of the tuberculin test. The steadily increasing number of non-reacting herds throughout Great Britain, and especially within a short radius of the Institute, is gratifying evidence of the influence of this work. The annual report [1] of the Institute for 1928, while it recognises

[1] Which may be obtained from the Secretary of the Institute, Shinfield, near Reading.

all this shows that more is necessary if a complete picture of the reasons for the varying constitution of milk is to be obtained. It has long been known that the proportions of fat and of solids-not-fat in milk of different breeds of cows vary widely, but it has now been shown that the variation is present in the milk of cows of the same breed, even when they are managed under the same conditions. It is probable, too, that the constitution of milk has a profound influence on the type of ripening which takes place in dairy products and may help to explain the differences which are found to occur in the maturing of cheese of the same character in different parts of the country. These considerations led to the study of the detailed constitution of milk, and one of the first discoveries was that in milk fever in cows the calcium balance of the blood is profoundly disturbed and that the administration of calcium has some value. Further work has made it possible to formulate a theory of secretion which will account for the high concentration of calcium in the milk as compared with that found in the blood of the cow. Since then the presence of calcium and its state in milk are of importance alike to the health of cattle and to the manufacture of many dairy products work was continued at the Institute on these lines. By feeding experiments it was shown that the presence of vitamin D increases the percentage of total calcium in milk, and in the laboratory that the relative proportions of diffusible and indiffusible calcium in milk are affected by even moderate heat. The latter observation may be of importance to the industry, since the curdling of milk for cheese is largely dependent on the quantity and state of the calcium which it contains. It may also prove more important to human nutrition than has been suspected hitherto. Many of the observations will hardly be fully explained until a more thorough study has been made of the physiology of milk secretion, and of the influence of the constitution of food-stuffs upon the final composition of milk. The report contains an urgent appeal, supported by many eminent physiologists, for means to set up a department of physiology within the Institute. We wish success to this effort in view of the importance to medicine of the work that is being done there.

TROPICAL FEVERS OF SHORT DURATION.

ALTHOUGH in prolonged infections the ætiological agents, such as the malaria parasite, the relapsing fever spirochæte, and the micro-organisms of undulant fever and the enteric group are readily isolated or identified, it is by no means always possible to ascertain the cause of fevers of shorter duration. The nature of these *febriculæ* varies considerably in different countries and the differential diagnosis is largely determined by geographical distribution. In fevers such as dengue, phlebotomus, and yellow fever, which may be extremely prevalent in a zone of military operations, the ætiological agent has not yet been recognised, so laboratory aids to diagnosis are confined to the more indirect reactions, such as the cytological response in the blood. A reduction in the total number of leucocytes may characterise all three of these infections, though the minor variations in the character, number, size, and shape of the different types of leucocytes may be actually misleading if too much attention is paid to them. A leucocytosis is found in relapsing fever, amœbic hepatitis, influenza, and less commonly in Weil's disease. The latter presents a special problem, for, although the leptospira may be abundant in the blood stream it cannot usually be demonstrated in a stained blood-film preparation, so that recourse must be had to animal inoculation and the reproduction of a disease with the characteristic pathology in the guinea-pig. Considerable assistance in diagnosis may, however, be obtained from microscopical examination of the centrifuged urine when the leptospira may often be demonstrated even in mild transient cases. Albuminuria occurs in Weil's disease as well as in yellow fever, but in the latter it is usually more intense; yet this well-known feature of differential diagnosis may be wanting in transient attacks of yellow fever unaccompanied by jaundice or the well-known stigmata of the disease, which, judging from the work of Hindle and other recent investigators of the yellow fever virus, probably precede and accompany every widespread epidemic. Serological reactions such as the specific agglutination of the organisms of the enteric group may be greatly delayed, especially in paratyphoid fevers, and no clumping of the organisms may be obtainable till convalescence has been well established. This is found usually in paratyphoid A infections, where the titre of agglutination may not be a high one and may appear only a week or more after the symptoms have subsided. In undulant fever of short duration, of which examples rarely occur, a further difficulty may present itself in what is known as the paradoxical reaction, or the zones of no reaction. Here no agglutination is obtained in low dilutions, but only in titres above 1 : 100, so that unless a suitable range of dilutions is made the diagnosis will certainly be missed. In typhus fever, even in mild and transient cases, the Weil-Felix reaction is of great diagnostic value, though the rationale of this reaction is by no means clear. By some it is held that slight degrees of insolation may produce pyrexia, and we believe this to be possible in susceptible individuals and especially in children. A certain proportion of cases, even in the most ideal conditions, will have to be given the depressing and well-worn label "pyrexia of unknown origin," though it might conveniently be replaced by that of "tropical fever of short duration." It was under this heading that the subject was fully discussed at the Fifth International Congress of Military Medicine and Pharmacy held in London last May. The official report of the Congress has now appeared and contains summaries of communications from medical officers from the Mediterranean stations, the French colonies in Africa, Greece, and Japan. Reports were also submitted by representatives of our own Army, Navy, and Air Force. The outcome of the discussions was, as would have been expected, that the correct classification of these fevers of short duration can only be obtained by due appreciation of the limitation of laboratory tests and the intelligent correlation of the laboratory findings with the clinical aspects of the case.

OUR CHANGE OF ADDRESS.

DURING the first 25 years of its life THE LANCET changed its home four times. For over 80 years, however, it has been published from the building at the corner where Bedford-street joins the Strand. The lease of this building having nearly expired, the proprietors of THE LANCET have acquired the freehold of an 18th-century house at No. 7, Adam-street, Adelphi, to which the offices of the journal will be transferred in the middle of next month. The Editor will be At Home on Wednesday, Oct. 16th at the new premises from 9 P.M. Admission will be by personal invitation, which will be sent if application is made to the Manager before Oct. 5th.

LAST week in the presence of representatives of the State of Hesse, a formal presentation of 4½ million marks, the equivalent of £225,000, was made to Nauheim Spa by an unnamed American in gratitude for her treatment there. The sum of 2 million marks is to go to a fund for endowing scientific work, an account of which will be given in an annual lecture of the Institute for which the remaining 2½ million marks is allocated. The Institute will include four sections: (1) for investigating patients sent to Nauheim under the social insurance scheme; (2) for statistical work into the causes of cardiac disease; (3) for social instruction on the causes and prevention of cardiac disease; (4) for experimental pathology and therapy. The Institute will give all the doctors in practice at the spa the opportunity of research, access to the

newest medical literature, and a medical museum as well as a conference hall. The building is to be erected opposite Bath House No. 8, and is to be begun at once. Gratitude could hardly have taken a more beneficent form.

WE regret to announce the death, on Sept. 22nd, after a long illness, of Ernest Edward Glynn, late professor of pathology in the University of Liverpool and honorary pathologist to the Liverpool Royal Infirmary.

The Clinical Interpretation of Aids to Diagnosis.

A Series of Special Articles contributed by Invitation.

XLV.

INTERPRETATION OF THE WASSERMANN REACTION IN ADULTS.

PART II.*—POSITIVE, NEGATIVE, AND DOUBTFUL REACTIONS.

Positive Results.

PROVIDED that a satisfactory technique is employed, and the test carried out by a competent pathologist a positive Wassermann reaction (++ or +) means that the patient is infected with syphilis—recent or remote. The only exception to this rule is "yaws." which also gives a positive W.R. However, since this disease is almost unknown in this country, and very similar to syphilis both in its clinical manifestations and reaction to treatment, whilst the causal organisms are indistinguishable, the exception has little practical significance.

Most text-books give a list, more or less long, of diseases in which the W.R. *may* be positive. Amongst these are included fevers of all kinds, especially typhus, typhoid, and pneumonia; scarlatina, malaria, tuberculosis, Vincent's angina; leprosy, especially the nodular variety; diabetes, nephritis, jaundice, thyroid disease, tumours of various kinds, lead poisoning; various skin diseases, including psoriasis, urticaria, pigmentosa, erythema iris; a number of tropical diseases, including trypanosomiasis, relapsing fever, pellagra, tropical ulcer, and beri-beri. In addition also, positive results have been recorded during pregnancy and general anæsthesia, and in sera from persons in articulo mortis and from cadavers. With the exception of yaws, however, none of these gives a consistently positive W.R. The majority can be excluded either as occurring very rarely in this country or because the differential diagnosis is easy. Scarlet fever has been reported as giving as many as 5 per cent. of positives—but I have personally tested more than 100 in all stages of the disease without obtaining a single positive result. Malaria is said to be particularly likely to give the reaction at the height of the fever; I can only say that this is not my experience, either in this country or in India, though in the latter country I have obtained a number of doubtful reactions when working in very high temperatures where the reagents, particularly the complement, were unsatisfactory and of very low titre. Few diseases have not at some time or other been implicated, but none has stood the test of time; as the technique of the W.R. has been improved so gradually the list has tended to shorten. Where a positive result is obtained and confirmed by retesting in any of the above, it will nearly always be found that syphilis is present as well if a careful investigation is made into the history and clinical side of the case.

Skin diseases are the ones which tend to cause most difficulty because of their resemblance to syphilis; of the three mentioned psoriasis has given a number of border-line reactions in my hands, but I have no special experience of the other two; in most cases there should be little difficulty, because if the lesion is syphilitic the blood will almost certainly show the strongest positive reactions, whereas non-syphilitic lesions are not likely to give more than a very weak positive result. In such cases the therapeutic test may be employed; a few injections of arsenic will nearly always clear up a syphilitic skin lesion; those due to other causes will not be benefited. This procedure should only be adopted in the last resort, and by none but experienced workers. In this connexion it is well to point out that, with the exceptions stated, a positive W.R. means syphilis; but it does *not* mean that all the patient's signs and symptoms are due to syphilis. A syphilitic patient may suffer from other diseases, and failure to afford full recognition of this fact has tended to bring both the W.R. and antisyphilitic remedies into disrepute.

Another possible explanation of a "false" positive result is an error in technique. Even the most careful and experienced pathologist may make a mistake, particularly in so complicated a reaction as the Wassermann. Moreover, confusion of specimens may occasionally occur in the best managed laboratories. J. A. Kolmer[1] states that minute amounts of acid or alkali present in the tubes or pipettes used may be the cause of a false positive, owing to their effect on complement. Over a long series of tests the occurrence of false positives should not exceed 0·2 per cent. Kolmer gives his incidence as less than 0·1 per cent. During the last nine years I have tested an average of 8000 tests annually, and I have found less than one false positive in 800 tests.

For the above and other obvious reasons it is evident that no case should be labelled syphilis on the strength of a single isolated positive W.R. where the history and clinical signs are against such a diagnosis. The test should be repeated—preferably on another specimen—and if still positive should, if possible, be confirmed by one or more of the various flocculation tests, such as the Kahn or Sigma.

Negative Reactions.

A negative reaction—especially an isolated one—does not absolutely exclude syphilis, especially where the history or physical signs point to a diagnosis of this disease. Early syphilis, before antibody has had time to be formed, treated syphilis, and the congenital variety in adults may be expected to give a negative result. Alcohol has been stated by C. F. Craig to convert, temporarily, a positive reaction to negative; but in an experience of nearly 100,000 tests I have never met this. Kolmer states that it is not his experience. Pregnancy is also stated to be the cause of occasional false negative reactions.

Another important point in this connexion is the almost daily variation in the antibody response to syphilitic infection; the fluctuating W.R.—on one occasion positive, and on another negative—is now recognised by most workers. This and other considerations demand that a negative reaction should be obtained on at least two occasions before excluding syphilis. Two or more negative reactions may be expected to exclude *active* syphilis in at least 90 per cent. of cases. Where an unexpected negative reaction is given, a provocative dose of arsenobenzol may be given as described below, and one or more of the flocculation tests carried out.

Doubtful Reactions.

A doubtful or "border-line" reaction, variously recorded as weak positive, weak negative, ±, is not sufficient alone to establish a diagnosis of syphilis, but may usually be taken as an indication for a further investigation of the case, both clinical and pathological. It frequently occurs in the early primary stage—e.g., a few days after the appearance of a primary sore; fortunately it is usually possible to clinch the diagnosis in such a case by finding the

* Part I., on Indications, Methods, and Notation, appeared last week.

[1] Serum Diagnosis by Complement Fixation, Baillière, Tindall and Cox, 1929.

Tp. pallidum either in the sore or in a neighbouring lymphatic gland. On the other hand, when such a reaction is given by the serum of a syphilitic patient who is having, or has had, treatment it is an indication for further treatment.

Where the diagnosis is in doubt, the test should be repeated, preferably after a "provocative" injection of arsenobenzol—e.g., 0·3–0·45 g. neosalvarsan given intravenously. The blood should be taken for retesting 2, 7, 13, and 21 days later; if only one retest is possible, the seventh day after the injection should be chosen. It is quite common to find that the provocative injection will convert a negative or ± reaction into a frank positive in a case of syphilis. This is probably intimately connected with the well-known Jarisch-Herxheimer reaction (a temporary exacerbation of the symptoms), which is said to be due to the destruction of spirochætes and liberation of their toxins. In any case, and more especially when the patient is under treatment for syphilis, it is well to confirm (or otherwise) a doubtful reaction with one or more of the flocculation tests. These reactions are for the most part more sensitive in treated cases than the W.R.

The following table gives the percentages of positive results found in the various stages of syphilis. It refers only to untreated cases, since the amount of treatment and the time elapsed since it was discontinued will vary, and the results would be of little value unless particulars were given in every case. The figures are the mean of those of a number of workers, including Kolmer, Craig,[2] L. W. Harrison,[3] and others.

—	Days after appearance of sore.	Per cent. positive.	—	Per cent. positive.
Primary S.	5–14	44	Tertiary S	80–97
	10–14	75	Latent S.	64–80
	21–28	82	Tabes	70–90
	28–42	94	G.P.I.	100
Secondary S.	—	98–100	C.S.S.	60–75

C.S.S. = Cerebro-spinal syphilis.

It is quite clear that in the very early stage of syphilis a large proportion of negative Wassermann reactions is to be expected, but none the less it is important that the reaction should be carried out *in every case* before commencing treatment, because the prognosis is so much better in a Wassermann-negative than in a Wassermann-positive case; it is as well to repeat the test a few days after the first or second injection of arsenobenzol, since these may convert a negative to a positive reaction (provocative effect). A negative W.R. in the presence of active syphilis is not unlikely to occur in pregnant women and in the vascular types of the disease, but in any stage of the disease a negative W.R. may be met with and the reaction should always be repeated in face of evident signs of the disease.

Effect of Treatment.

L. W. Harrison says: "There is no doubt that the Wassermann test, in conjunction with clinical signs, is a far better guide to the immediate effect of treatment than clinical signs alone." In the large majority of cases treatment may be expected to convert a positive W.R. to negative; generally speaking, when the treatment is begun in the early stages of the disease the W.R. usually becomes negative rapidly. Conversely, when the disease has existed for a number of years—e.g., in tertiary syphilis—very prolonged and energetic treatment is usually required. In primary syphilis the W.R. usually disappears in three weeks, and in nearly 90 per cent. of cases in six weeks; in secondary syphilis it is common to find the W.R. negative by the end of the first course (say 12 weeks). In later syphilis much more time and treatment are usually required, depending on a number of factors.

When the reaction has been converted to negative, it is of the utmost importance not to discontinue treatment but to follow up within a few weeks, because it is a common observation that a W.R. which relapses is extremely difficult to convert to negative again. The amount of treatment required must be determined individually for every case, but it is usually found that at least one course of treatment (say ten weekly injections of arsenobenzol and bismuth or mercury) is necessary after the W.R. has become negative. The sooner the W.R. becomes negative the better the ultimate prognosis, but it cannot be too strongly urged that a single negative W.R. must never be accepted as proof of cure of the disease. A ± or doubtful reaction occurring during treatment may usually be regarded as positive—that is to say, it means that more treatment is required; it should never be disregarded.

A Quantitative Test.

In order to observe closely the effect of treatment some form of quantitative test is desirable. Where at the end of a course of treatment the W.R. is reported as still + + (strongly positive), the clinician is in the dark as to what effect his treatment has had. For this purpose I have in the past tested out a series of dilutions of the patient's serum—e.g., 1/10, 1/15, 1/20, and so on, to 1/100—1/5 being the dilution ordinarily employed. In this way an end-point can always be reached. When a serum is reported as positive at 1/100 before treatment, positive at 1/50 after one course, and positive at 1/20 after a second course (though in each case the routine report would be "strongly positive"), both doctor and patient will be encouraged to continue with treatment. An even more satisfactory way of arriving at the same result is to have recourse to the Sigma test, which records results in units; thus under treatment a case of tertiary syphilis may fall from 20 units to 7·5 in three months, and in six months to 2·5 (1·5 units or more are considered positive for diagnosis, and 1·0 or more for test of cure). A quantitative test is not a necessity, but it is often of value in estimating the effect of treatment and in persuading the patient to persist in a treatment which may be long and irksome.

Effect of Different Drugs.

The drugs which have most effect on the W.R. are arsenobenzol (in its various forms), bismuth, and mercury (given by inunction or injection) in that order. Mercury by the mouth has little if any effect—and I believe the iodides have none. By this I do not mean that mercury or iodide should not be given by the mouth, but that they have no direct effect on the W.R.

Test of Cure.

In order to establish presumptive cure the W.R. should be consistently negative over a period of *at least* two years following cessation of treatment. It is usual to test the blood at the conclusion of treatment, and thereafter every three months during the first year, and six-monthly during the second year. The tests at the end of each year should be preceded by a provocative injection, and the last test should be accompanied by an examination of the cerebro-spinal fluid. Experience has shown that an early primary case which remains negative for a year will almost invariably continue negative. A late primary or a secondary may relapse even after being negative for two years. If a patient has relapsed after a given amount of treatment or has not commenced treatment till a later stage than those mentioned above, no guarantee can be given that the reaction will not return if treatment is suspended for any considerable length of time.

What is of importance is that if a given patient is going to relapse he will usually relapse serologically

[2] Craig, C. F.: The Wassermann Test, Henry Kimpton, 1921.

[3] The Diagnosis and Treatment of Venereal Diseases in General Practice. Third edition. 1926. Oxford University Press.

before he does so clinically. Hence the value of repeated blood tests.

Persistent Positive W.R.

Not infrequently a patient will continue to give a positive W.R. after repeated courses of treatment, and the question arises will it *ever* be possible to convert the W.R. to negative? May not the patient be already cured? It is my firm opinion that a strongly positive W.R. means that *living spirochætes* are lodged somewhere in the patient's tissues. If quantitative tests of some kind are carried out it will usually be found that there is a slow but progressive fall in the strength of the reaction, so that if treatment is persisted in a negative result will generally be obtained in the long run. Kolmer says: "I have seen so many relapses follow the cessation of specific medication among those tired of the 'tyranny' of persistently positive reactions . . . that I believe a very heavy responsibility rests upon any physician . . . who deliberately ignores them in the treatment of the disease." Such patients require continued observation and periodic courses of treatment, even, in some cases, for the remainder of their lives.

The Influence of Pregnancy.

It has often been stated that false positives occur in pregnancy, but this is not my experience. Kolmer states that the opposite holds, and that pregnancy may be the cause of false negatives, and this also applies to the lactation period. A single negative, therefore, should not be trusted. A syphilitic mother with a negative W.R. may produce a syphilitic child.

Congenital syphilis in children has already been dealt with in this series of articles,[4] but it should be pointed out here that the W.R. tends to die out as they grow up, so that adolescents and young adults may show a negative reaction. Kolmer states that in young adults with latent syphilis 40 per cent. of positives may be expected, whilst those with skeletal lesions will give 70 per cent. of positives. He also states that 80 per cent. of the fathers and 60 to 90 per cent. of the mothers of syphilitic children give positive reactions. There can be little doubt that the mother of a syphilitic child is herself nearly always syphilitic, even though she may be apparently healthy. Both parents of a syphilitic child should always have their bloods tested.

Examination of Cerebro-spinal Fluid.[5]

The technique of collecting a specimen is hardly within the scope of this article. Like many other procedures, it is easy for those who are accustomed to do it, but often difficult for the uninitiated. It is not an operation to be undertaken lightly on account of the somewhat severe headache which may follow withdrawal of the fluid; moreover, it is not always convenient for the patient to keep his bed for at least two days as he should. On the other hand it should never be shirked where there are clear indications for its performance.

The special indications for testing the cerebro-spinal fluid are: (1) test of cure; (2) any suspicion of involvement of the central nervous system; (3) a persistently positive W.R. in the blood.

About 5 c.cm. is a convenient quantity to draw off and this should be clear and free from blood. The cerebro-spinal fluid usually contains much less Wassermann-reacting substance than the serum and therefore the W.R. is carried out in rather a different way. Varying amounts of the fluid are tested with fixed amounts of the other reagents, and the results are returned as 4, 3, 2, or 1, plus and negative. Four, three, and two plus are considered definitely positive, one plus as doubtful. It does not seem to be generally known that changes occur in the cerebro-spinal fluid not uncommonly in the early stages of syphilis. C. H. Mills, at Rochester Row, found changes in the fluids of 47 per cent. of secondary cases. It should also be remembered that a patient may have a positive cerebro-spinal fluid with a negative blood. Kolmer gives the following table of incidence in the various stages of syphilis:—

	Positive W.R. per cent. in C.S.F.
Late primary and secondary	30–40
Asymptomatic, early, untreated	30–40
„ late, „	80–90
Tabes	96
Paresis	100
Cerebro-spinal syphilis	96–100

It is not suggested that it is necessary or even desirable to examine the cerebro-spinal fluid of every case of early syphilis, but the frequency with which the nervous system is involved is of interest. Under the influence of treatment the early cases quickly show a negative reaction; syphilis of the supporting structures is also fairly amenable to treatment. Tabes often shows considerable weakening of the reaction, but G.P.I. is most intractable except in the most favourable cases under the influence of malaria therapy combined with arsenobenzol.

A positive W.R. in the cerebro-spinal fluid is even more specific than in the serum, though there are often no changes in the fluid in cases of syphilitic arteritis of the cerebral vessels. Moreover, the W.R. is far superior in sensitiveness and specificity to most, if not all of the flocculation reactions.

It is customary to perform three other types of test on the cerebro-spinal fluid, since these help to confirm the W.R.

(1) Estimation of the number of cells, which are usually small lymphocytes. Less than 5 per c.mm. may be considered normal, 5 to 10 doubtful, and more than 10 positive.

(2) *Globulin* cannot be demonstrated in a normal fluid. Excess is commonly present in syphilis of the central nervous system, though it should be pointed out that excess neither of lymphocytes nor of globulin proves that the pathological process is syphilitic.

(3) *Colloidal reactions*, such as the Lange gold-sol, benzoin, and mastic reactions. Various curves are used to record the results of these, the most diagnostic being that attributed to G.P.I., in which there is precipitation of the colloid with the lower dilutions of the fluid, tailing off gradually to none with the higher dilutions. Tabetic and luetic curves are also described.

A negative fluid should be negative to all three of these types of test, as well as to the W.R., since these reactions tend to run parallel, though some react to treatment more readily than others.

Summary.

(1) The Wassermann reaction is highly complicated. Choose a sound technique, a reliable pathologist, and a good laboratory. For purposes of comparing results at various stages in the treatment it is better to keep to the same pathologist and the same technique.

(2) See that the specimen is ample in amount and of good quality.

(3) Give the pathologist all the information which may be helpful and ask for his opinion on the interpretation of the result.

(4) A positive result nearly always means syphilis. If there is a doubt it should be repeated and confirmed.

(5) One negative result does not exclude syphilis; two or more usually do.

(6) Mistrust "weak positives" and "doubtfuls" where the diagnosis is in question.

(7) When treating a case of syphilis have the blood tested frequently—a serological relapse precedes a clinical one.

(8) To establish a cure time is just as important as negative Wassermann reactions.

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[4] Nabarro, D. N.: THE LANCET, 1929, i., 90.

[5] This subject has been dealt with in detail in this series by Dr. J. G. Greenfield: THE LANCET, 1928, ii., 716.

Special Articles.

THE TRAINING AND EMPLOYMENT OF MIDWIVES.

REPORT OF THE DEPARTMENTAL COMMITTEE OF THE MINISTRY OF HEALTH.[1]

A COMMITTEE was appointed in May, 1928, to consider the working of the Midwives Acts, 1902 to 1926, with special reference to the training of midwives (including its relation to the education of medical students in midwifery), and the conditions under which midwives are employed. The Committee consisted of Sir Robert Bolam (chairman), Dr. J. W. Bone, Dame Janet Campbell, Lady Cynthia Colville, Dr. W. A. Daley, Dr. J. S. Fairbairn, Dr. T. Eustace Hill, Miss Alice Gregory, Mr. A. B. Maclachlan, Dr. F. N. Kay Menzies, Mrs. Bruce Richmond, and Miss Stephenson, with Mr. W. H. Howes, of the Ministry of Health, as secretary. Mrs. E. Barton was subsequently appointed as an additional member.

The Committee have now issued their report, which is divided into five parts. Part I. (four pages) supplies a historical survey of conditions before and after the passing of the first Midwives Act in 1902 and of the constitution and development of the powers of the Central Midwives Board under this Act and successive Acts passed in 1918 and 1926. Part II. (five pages) is entitled Maternal Care. Here the desirability of coöperation between midwife and practitioner is outlined, and administrative and financial arrangements are discussed. Part III. (14 pages) is devoted to the training of midwives—the standard of education, age of entry, the type of pupil, the duration of her training, and the need for post-examination experience. Various suggestions designed to overcome the acknowledged shortage of clinical material are outlined but are not examined in detail. In Part IV. (24 pages) the present conditions of employment of midwives is discussed fully, with proposals for their improvement. Part V. (13 pages) are concerned with administration and recommend changes in the duties and functions of the Central Midwives Board. Part VI. (five pages) deal with miscellaneous questions, such as the payment and recovery of doctors' fees, the practice of uncertified women, maternity nursing, and home helps. In a final paragraph the Committee refer to certain representations which have been brought before them in regard to the administration of anæsthesia in confinements. The plea has been made for more general use of anæsthetics, both in hospitals and in patients' homes. The Committee note that it does not appear to be widely understood that the use of anæsthetics and other drugs is not without danger to mother and child in certain circumstances.

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS.

The last 15 pages of the report are filled with a summary of conclusions and recommendations, of which the more important are set out below.

Maternal Care.

Any measures directed solely to the better training of midwives and the improvement in the conditions of their employment would not materially contribute to the reduction in maternal mortality and morbidity, unless they were accompanied by wider measures to deal with this problem on a national basis. A material contribution to this end might be made by initiating a comprehensive maternity scheme related to National Health Insurance whereby, whilst retaining the principle of a cash payment as at present administered by approved societies, the scope of maternity benefit would be expanded to include the provision of essential health services, organised on a local basis and administered in coördination with other services of a similar nature by the local supervising authorities responsible for the supervision of midwives under the Midwives Acts.

The essential services should in part consist of:—

(*a*) The full services of a certified midwife.

(*b*) Provision for a doctor's advice on the call of the midwife in abnormality or doubt.

(*c*) The provision on the doctor's request of the assistance of an obstetric specialist to deal with exceptional emergencies.

(*d*) The provision of administrative and financial arrangements for institutional care in certain cases during pregnancy, and for the confinement in a maternity institution of (1) women whose home conditions are unsuitable, (2) those who by reason of some abnormal condition require institutional treatment, and (3) those who may elect to be confined in an institution, irrespective of their home conditions and the need for specialised institutional care.

There should, as an ideal, be also available examination by the doctor (*a*) early in pregnancy, (*b*) one or two months before the birth is expected, (*c*) six weeks from the date of birth.

The medical practitioner undertaking the supervision of mothers during pregnancy should not only be conversant with modern antenatal work, but have special experience in its methods. Steps should be taken to see that examinations are not perfunctory, and that the data obtained thereby are so registered as to be available throughout the progress of the case. There are undoubted advantages in the doctor responsible for the antenatal supervision being also the doctor who may be on call, or in attendance, during confinement and the puerperal period.

A mother should be at liberty to select the doctor who examines her, and, if she so desires, be assisted to engage a doctor as well as a midwife to attend her during confinement.

There is much to be said for the introduction, in relation to the ten months which comprise the time of pregnancy and lying-in, of a medical general practitioner service comparable to the medical service as at present provided under the National Health Insurance Acts.

The Position of the Midwife Under a Maternity Scheme.

The midwife should give considerably more attention and time to each of her patients than has hitherto been accepted as the usual standard. In order that she should not undertake more work than she can with efficiency perform, it would be necessary (*a*) to limit the number of cases that the midwife (acting alone or as maternity nurse) should be allowed to attend; (*b*) considerably to increase her fees. Subsidies should be granted by local supervising authorities to midwives working in rural areas, who would be unable to earn a reasonable competence even with an increased fee.

Necessitous Cases.

Local authorities would be charged with the duty of providing adequate medical, midwifery, and nursing care for the comparatively few women in necessitous circumstances who would remain outside the ambit of a national maternity scheme.

The formation of local panels of independent midwives for attendance on these necessitous cases would largely obviate the need for the employment of whole-time municipal midwives.

Training of Midwives.

Standard of Education.—There should be a preliminary examination of an elementary kind for women who desire to enter the midwifery profession, exemption being granted to persons who have passed a higher examination and to trained nurses. The preliminary examination should be held in all parts of the country, and should be placed in the hands of local education authorities.

Age of Entry.—A maximum age of entry to the midwifery profession is as important as a minimum age; the minimum age for commencing training should be 20 years and the maximum 40 years.

[1] London, 1929. H.M. Stationery Office. Pp. 96. 1s.

The time is not opportune to restrict entrance to the profession to women who hold the general nursing qualification.

Duration of Training.—Since the present periods of training were fixed only in the year 1926, it would be premature to suggest any radical change. If in the future the length of training is increased, arrangements should be made for pupil midwives, other than trained nurses, to obtain more adequate instruction in general nursing.

A *clinical examination* for pupil midwives would be a most valuable addition to the present methods of deciding the suitability of the individual candidate for entrance to the profession.

Post-examination Experience.—The present system of certification should be altered so that in future every pupil midwife would be required after passing the examination to undergo a period of three months post-examination experience under supervision, during which she would be made personally responsible for the conduct of labour in not less than five cases. Thereafter she would be eligible to have her name placed on the Roll of the Central Midwives Board, and be fully licensed for independent practice. The post-examination experience should be undertaken within six months after the passing of the examination.

Midwives whilst obtaining the post-examination experience should be expected to assume the full responsibility appropriate to their calling; this end would best be achieved by making arrangements for them to be appointed as members of the staff of small maternity institutions specially recognised for the purpose, or as assistants to competent and experienced independent midwives specially approved for the same end. The onus of providing suitable openings for post-examination experience would fall on the training schools.

Training in Large Institutions.—There are obvious advantages in pupil midwives being trained in institutions sufficiently large to give a variety of experience and which possess an adequate supply of apparatus. Such an institution should have at least 20 maternity beds, and should provide an adequate number of deliveries on an attached extern district.

Training Material.—It is both undesirable and impracticable to subject pupils who do not intend to practise as midwives to a procedure in relation to training, examination, or certification differing in any way from that imposed upon those who intend subsequently to take up practical midwifery work.

In centres where medical schools are situated a considerable part of the available training material is absorbed by pupil midwives who do not intend to practise after certification, to the detriment of the interests of medical students. It is not merely in the interests of medical education but in the interests of the mothers that the obstetric training of the medical student should be as thorough as possible, and to this end students in a medical school area should have preference in the apportionment of clinical material. Pupil midwives in course of training in connexion with a medical school should be allowed to make use of such material only in so far as it is in excess of the needs of medical students.

A *central clearing house* would collate information as to the vacancies which occur from time to time in the various training schools, and would superintend the work of distributing pupils who were not able to complete the whole of their practical training in connexion with a medical school. It might also advise training schools as to the recognised maternity institutions and approved independent midwives to whom after certification pupils should be sent for their post-examination experience.

Post-certificate training, the present facilities for which are extremely limited, should be encouraged and arranged for midwives at regular intervals by all local supervising authorities, who would bear the cost thereof.

An *examination for non-medical teachers* of midwifery should be instituted, to ascertain the teacher's knowledge of her subject and her capability of imparting it to pupils.

Miscellaneous Training Matters.—Whilst there is no advantage to be gained by teaching medical students and pupil midwives together in relation to the systematic part of their training, the same objection cannot be raised with regard to the clinical part of the training, having regard to the desirability of bringing these two classes into association at the earliest possible moment in order to encourage them to coöperate later on in their career. The practice followed by certain hospitals in allowing medical students to attend district midwifery patients without being accompanied by a properly certified midwife to undertake their nursing work is open to grave objection and should be discouraged. As regards the midwifery training of medical students generally, the recommendations promulgated by the General Medical Council in the year 1923 are based on reasonable and progressive lines, but the different medical schools do not yet fully conform with the recommendations.

There is a lack of adequate facilities for the post-graduate instruction of medical practitioners, and medical schools should take steps to develop, so far as may be practicable, suitable courses to meet what is undoubtedly a real need.

Employment of Midwives.

Supply of Midwives.—Approximately 20 per cent. of the rural population of England is at present unprovided with the services of trained midwives. With the progressive expansion of the work of nursing associations the shortage will to a large extent be overcome, but in certain areas special arrangements will have to be made. The supply of midwives in the county boroughs and other large boroughs is generally excessive, partly because a large number of midwives, not solely dependent upon midwifery work for a livelihood, engage in occasional practice to supplement their incomes. In some boroughs midwives have not been able to establish themselves owing to the persistence of the custom of employing uncertified women.

Disadvantages Attaching to Midwifery Practice.—Midwives who are trained nurses mostly do not practise after certification, because they are generally able to find more attractive and lucrative work. The better trained and better educated women are deterred from becoming practising midwives owing in the main to the heavy individual responsibility and arduous nature of the work, and to the lack of reasonable remuneration normally to be gained.

Independent practising midwives are subject to other disadvantages—e.g., the competition of uncertified women, of certain nursing associations, training institutions, and hospitals and the absence of any definite provision for superannuation or old age.

Methods to Improve Conditions of Employment.—Midwives should be guaranteed security in old age.

Adequate relief during sickness and emergencies and for off-duty times is essential; the local supervising authority should adopt local schemes of relief, the cost of which should, where necessary, be defrayed out of public funds.

The services of whole-time midwives employed in a few instances by a municipality which acts both as the maternity and child welfare authority and as the local supervising authority under the Midwives Acts, might well be utilised in connexion with a scheme of this character.

Aid towards the provision of transport and telephone facilities for midwives practising in rural areas should be provided by each county council concerned.

Housing authorities providing new housing estates might earmark accommodation for midwives who desire to practise in the neighbourhood of such estates.

Reasonable compensation should be paid by the appropriate local authority to a midwife when a patient has been taken out of her charge and sent to a maternity institution for treatment.

General.

Whilst there can be no absolute ban on the administration of sedative drugs by midwives on their own responsibility, because of the occasional emergencies with which any midwife may be faced when the services or advice of a doctor are not available, midwives cannot be regarded as fitted,

either by training or experience, to be given complete freedom in the use of such drugs.

When a midwife has ceased to practise for a considerable period and desires to resume midwifery work, or where a midwife although in practice has attended an insufficient number of cases to remain efficient, the local supervising authority should be empowered to represent these facts to the Central Midwives Board, in order that the Board may determine whether the midwife should be required to undergo post-certificate instruction.

The local supervising authority should have power in cases of this nature to suspend the midwife from practice, pending the promulgation of the Board's decision.

Section E of the rules of the Central Midwives Board, whether or not retained in its position of statutory authority, requires to be revised and rearranged.

Administration.

Supervision of Midwives.—There is a lack of uniformity in the arrangements adopted by local supervising authorities for the supervision of midwives, due to the absence of any standard qualification for inspectors of midwives, and the following changes are desirable :—

Medical Inspectors.—(*a*) Wherever possible, every new appointment to the post of chief inspector of midwives should be given to a medical officer who has had actual experience of obstetric practice and who is engaged on other work of a similar nature—e.g., as an assistant medical officer for maternity and child welfare.

Non-medical Inspectors.—(*b*) Subordinate positions for routine inspections should be filled, when vacancies arise, by midwives who are trained nurses and have had long experience in the actual practice of midwifery. It would be in the interests of midwives if the Minister of Health were given power to prescribe the qualifications that should be held by inspectors of this class.

Midwives should have ready access to the medical inspector. The employment of health visitors with little or no practical experience of midwifery for the inspection of midwives is to be deprecated.

The dual routine inspection of particular midwives who practise in the area of more than one local supervising authority is highly objectionable.

Central Midwives Board.

This Board has dealt with the intricate problems confronting it with good judgment, but certain alterations in its powers and duties are desirable.

The present system of discipline under which midwives are punished for failure to comply with the rules prescribed by the Central Midwives Board, in view of the improved status of the profession, be altered on the lines indicated below :—

(*a*) The Board should be given general power (1) to suspend, or when necessary to erase from the roll the name of any midwife found guilty of a felony, misdemeanour, or offence which, in the Board's opinion, renders her unfit to practise ; and (2) to caution, suspend, or remove from the roll a midwife who, after due inquiry, is judged by the Board to have been guilty of conduct in any professional respect which makes her unfit to pursue her calling, or of a midwife who carries on her work in such a way as to endanger the health or life of the mother or child. (*b*) If the Board were given these powers the existing rules which regulate, supervise, and restrict the practice of midwives could be relegated from their present position of definite statutory authority and penal significance to a less commanding, but still important place. To this end the Board might issue to every midwife practising in England and Wales warning notices or instructions.

It would be an advantage if the Board were to appoint an independent legal assessor whose opinion would be available at penal proceedings.

Power should be conferred on the Board to subpœna witnesses and to require evidence on oath and the production of documents.

Where a local supervising authority represents a prima facie case of negligence, malpractice, or misconduct to the Board, the prosecution of the charge should rest solely with the authority ; it should be competent for any other interested body or individual complainant to bring a case before the Board in the same way. In a residuum of cases the Board must take action on its own initiative.

Existing arrangements for the approval and inspection of training institutions and teachers by the Central Midwives Board are unsatisfactory by reason of their extremely limited scope. The whole of this work should be placed in the hands of the Minister of Health, on whose behalf the majority of the institutions recognised as training schools by the Board are at present inspected by officers of his department, either in connexion with grants in aid of midwifery services or the training of midwives, or as part of the routine inspections of poor-law institutions. An advisory committee, consisting of persons appointed by the Minister of Health on the nomination of representative bodies (including the Central Midwives Board) should be formed to advise the Minister regarding matters coming within the scope of his inspecting and approving duties.

The duty of formulating the course and length of training should also pass from the Central Midwives Board to the Minister of Health.

In order to keep the work connected with the examining of pupil midwives apart, both in personnel and association, from the judicial functions of the Board, an examinations board should be appointed which should be directly answerable to the Central Midwives Board for the conduct of its duties. It would be of great advantage for the advisory committee to the Minister of Health to be represented on the examinations board.

If effect is given to these recommendations the functions of the Board, besides keeping the roll of midwives, would be mainly disciplinary, and it would then be possible and advantageous to constitute the Board with a small compact membership.

Members of the Board might serve for a period of five years and be eligible for re-election or renomination as the case may be.

Provision should be made to secure the payment to members of the Board of a specific fee for attendance at meetings.

Sundry Recommendations.

The scale prescribed for the payment of the *fee of a doctor* called in by a midwife in a case of emergency should be reconsidered by the Minister of Health in consultation with the local supervising authorities and the British Medical Association.

The time limit of two months imposed for the presentation of a doctor's account to the local supervising authority should be extended to three months.

The attempts which have been made by law to prevent the *practice as midwives of uncertified women* have largely failed in their object, and it would seem that the remedy for this abuse can best be found in the application of a State maternity scheme.

It is highly important that the nursing of women during the puerperium should, in general, be carried out by a certified midwife. The practice followed by certain hospitals of training women as maternity nurses is open to objection, and should cease as soon as possible.

The duties of a *home help* should be strictly limited to the ordering and care of the household as usually carried out by the mother herself. Nursing duties do not come within her province.

Use of Anæsthetics in Confinement.—It would be in the public interest if some professional body would take upon itself the responsibility for issuing at an early date some pronouncement as to the advisability and place in labour not only of anæsthetics, but also of analgesic and sedative drugs generally.

RESERVATIONS.

Dr. J. S. Fairbairn and Mrs. Bruce Richmond express assent to the report with the exception of certain recommendations concerning the Central Midwives Board. The points in which they dissociate themselves concern those recommendations that involve the splitting up of the functions hitherto assigned to the Midwives Board and their distribution between a reduced Board, the Ministry of Health, and an advisory committee. In their opinion the suggested changes are in no way essential to the midwifery

service outlined in the report, and, if carried into effect, would be detrimental. The reasons which have led Dr. Fairbairn and Mrs. Richmond to make these reservations are set out on pp. 84 to 88 of the report. Their arguments are closely reasoned, and should be consulted. Among the points they make is that no evidence to justify the drastic changes contemplated was put before the committee. The proposal to effect them was submitted by the London County Council at a late stage, and there was no opportunity of testing the suggestions by reference to the bodies most affected by the proposed changes. Dr. Fairbairn and Mrs. Richmond would have welcomed a recommendation that the Central Midwives Board should exercise a wider and more general inspection than it has done, especially if poor-law institutions were included, and would have preferred the employment by the Board to a further degree of obstetric teachers of recognised standing, rather than the institution of a whole-time inspectorate.

"Dual inspection" appears to them to be a bogy that loses its terrors when closely examined. Not only do the reasons set out in the report fail to convince them of any advantage to be gained by the transference of the powers of approval to the Minister of Health, but the experience of the Central Midwives Board has shown that a similar transference in the past proved unsatisfactory and was given up. Training in all poor-law hospitals was removed from the purview of the Midwives Board at an early stage in its history. When the supervision of poor-law institutions was resumed by the Midwives Board in 1924, a large number were struck off the approved list because they were wholly unfitted to be training schools, and fell far short of the standard required of non-poor-law institutions.

In view of the considerable number of municipal and other maternity hospitals under the local health authorities—a number to be vastly increased shortly—and in view of the close relationship of the Ministry to these authorities, Dr. Fairbairn and Mrs. Richmond urge that an outside and independent body like the Midwives Board should have the decision as to their efficiency as training schools. They hold that this proposal to break up work that has been welded into a compact whole, and the distribution of its parts between an attenuated Midwives Board and a department of the Ministry of Health, with an advisory committee at its back, makes a dual control that is not likely to draw women into a profession already groaning under a weight of official supervision.

The midwives should have control over their profession at least equivalent to that exercised by registered nurses over theirs; a gradual increase in the elected representatives should be the aim, so that both, with some outside help from the medical profession and others, may ultimately be able, as other professions are, to determine conditions of training and entry and to maintain their own professional standards.

ROYAL WATERLOO HOSPITAL.—For the convenience of women and girls employed during the day, this hospital for children and women, in Waterloo-road, S.E., will from Oct. 2nd open its out-patient department every Wednesday evening.

BURY INFIRMARY.—Prof. A. H. Burgess, on Sept. 21st, opened an extension of the Bury Infirmary. This year it celebrates its centenary, having been founded in 1829 as a dispensary for the care of the "sick and injured poor." A bequest of about £65,000 from the estate of Colonel John C. Barlow has made extension of buildings and equipment possible. A sum of £30,000 is still required for endowment, and of this £17,000 has already been raised. Besides ordinary beds, 11 private nursing rooms in which patients of limited means can be accommodated and treated have been provided. These rooms are all provided with a light signalling device, which replaces the bell. The charge for these rooms is 5 guineas a week. There is also a ward with 10 beds for maternity cases. The new general ward for women has 22 beds. The extensions have increased the beds from 123 to 170, and a corresponding addition is required for the nursing staff, to be met by a new nurses' home for about 50 nurses.

THE FOSSIL MAN OF PEKING.

BY SIR ARTHUR KEITH, M.D., F.R.S.,
CONSERVATOR OF THE HUNTERIAN MUSEUM OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.

IT is possible that many readers of THE LANCET may be in two minds as to the most recent addition to the Gallery of Ancient Man: is "Peking Man" a genuine antique or is it, as has so often happened before, merely a cobwebbed modern replica?

Thanks to the generosity of Prof. Davidson Black, of Peking Union Medical College, I have had exceptional opportunities not only of following the steps which led to the discovery of Peking Man, but also of examining all the documents relating to his authority, and I can assure my readers that they may take Prof. Davidson Black's announcement at its full face value. Without doubt the portrait just discovered is one of the most valuable ever added to the portrait gallery of our fossil ancestry. It takes a place with four others — Pithecanthropus, discovered in Java; Piltdown Man (Eoanthropus), discovered in England; Heidelberg Man (Palæoanthropus), discovered in Germany; and Rhodesian Man, discovered in Africa. In one sense it is more important than any of those just named, because Peking Man reveals affinities to modern (neanthropic) man more than the others do, and has a better claim than they have to a place on the evolutionary line of descent which has culminated in man of the modern type.

A Genuine Antique.

That we have obtained a "genuine antique" there can be no doubt; the age at which Peking Man lived was fixed before his actual remains were found; the cave deposits in which his bones lay contain an abundance of fossil animal bones; these date the cave strata as early pleistocene, which on the most moderate of reckonings indicate an antiquity of at least a quarter of million years. Of true mankind at this stage of the world's history we had obtained but two glimpses—both in Western Europe. It is true we had a revelation of very ancient humanity in Java, but the early history of man in that vast region of the old world, which stretches from Western Europe to the furthest end of Asia, remained buried in darkness until Prof. Davidson Black made his first announcement in 1927. We now know what sort of beings lived in distant Asia in early pleistocene time. The characters of this ancient fossil form suggest that it is in Asia we are to find the evolutionary cradle of the European type. We have long wondered where the Cromagnons and other neanthropic peoples who invaded Europe and extinguished its Neanderthal natives came from. The Peking discovery points to Asia as the homeland of our palæolithic ancestors.

Let me outline the course of events which led up to the discovery of the Peking Man—Sinanthropus he has been happily named by Prof. Davidson Black. So long ago as 1903, Prof. Max Schlosser described a fossil tooth from Peking; he could not make up his mind whether it was that of a man or of an anthropoid—so blended in it were both sets of characters. This tooth was part of the stock of a Chinese apothecary, and would have, in the ordinary course of events, been ground to form medicine. In China they unwittingly consume the bones of pleistocene ancestors as medicine; in England we sometimes use them as road metal! Prof. Schlosser's publication simply drew attention to China as a possible home of ancient man; nothing more. The next step was taken in 1920. In that year Dr. J. G. Andersson, a Swedish geologist attached to the Government Survey of China, found himself among the hills to the south-west of Peking, and there at a place named Choua Kou Tien—only 25 miles from the capital—he observed an extensive cave deposit rich in animal remains. He wished to discover the nature and age of the contained fauna. An extensive collection of fossil bones was made, and early in 1926 Dr. O. Zdansky,

a German palæontologist, was sent to Sweden with the collection to examine and identify its various fossil items in the laboratory of Prof. Wiman, of Upsala. While so engaged, in the summer of 1926, Dr. Zdansky came across two fossil human teeth—a lower premolar, an upper third (wisdom) molar. When news of Dr. Zdansky's discovery reached Peking, the Geological Survey of China, under an enlightened directorate, and the Peking Union Medical College, under the enthusiastic leadership of Prof. Davidson Black and the financial backing of the Rockefeller Foundation, placed an exploring company in the field early in the summer of 1927. A season's exploration ended on Oct. 16th, by Dr. Burger Bohlin finding, in the matrix of the deposit, a hard travertine rock—the unworn crown of a lower molar tooth—that of a child aged about seven years.

Characters of a New Genus.

That small specimen was all that was found of the ancient cave-dwellers during the first season's exploration. For Prof. Davidson Black it was sufficient. Those who know teeth recognise in them what ordinary men find in a human face—a multiplicity of features which provide sure guidance to racial identification. Prof. Davidson Black found features on this isolated unworn molar which had never before been seen in the molars of men, ancient or modern. Anthropoid and human features were blended; on the strength of this one tooth he created a new genus of humanity, naming it Sinanthropus, the local Peking representative becoming *Sinanthropus pekinensis.*

To those unfamiliar with dental anatomy this precipitate act of christening may seem both audacious and premature. But the anatomist's sagacity was justified by subsequent events. In the summer of 1928 an expedition again took the field, and an arduous season's work was crowned by the discovery of the following fossil parts: (1) Several large fragments of the cranial wall; these proved that Sinanthropus, like Piltdown Man, had already attained a human size of brain—a brain as large as is given to the lower living races of mankind. In the words of Prof. Davidson Black, "Sinanthropus was a large-brained form." (2) Almost the whole of the right body of a lower jaw—all save the part which supports the lower incisors. (3) The greater part of the lower jaw—including the chin region—of a child aged 7 or 8 years. (3) About 24 isolated teeth.

In the Direct Line of Human Descent.

Many of these fossil parts have still to be extracted from the rock-matrix, but enough has been exposed to justify all the inferences drawn by the anatomist from the single molar. In their actual dimensions and in their arrangement in the jaw, the teeth of Sinanthropus are not materially different from those of an Australian aborigine. The total molar length is 34 mm.—an extent often reached in the dental series of living races. The canine teeth are in no wise ape-like, as were those of Piltdown Man; as in the Heidelberg jaw, they have sunk to the level of their neighbours. Yet in the molar teeth simian features are apparent; some are also to be seen in the details of structure of the cusps and crown. A minute study of the cusps reveals to my eye certain changes which in their nature are identical with those to be observed in the molar teeth of neanthropic man. In spite of their simian features and individual peculiarities the molars of Sinanthropus make a nearer approach to those of modern man than do the teeth of any of other ancient type.

The bony framework of the lower jaw reveals stages in the passage from an anthropoid to a human form. The simian shelf is disappearing; the first rudiment of the true chin has appeared. We see the separation and differentiation of the two elements of the lower jaw—the alveolar element, which is concerned in the support of the teeth, and the basal bony framework, which supports the alveolar bone and gives attachment to muscles. In the ape the alveolar bone predominates and masks the basal element; in modern man the alveolar element has become reduced, thus exposing the enlarged basal framework on which the shelf of the chin is set. In the crudely fashioned mandible of Sinanthropus we have a transitional stage—one in which basal framework and chin are attaining a separate differentiation. The dental canal of Sinanthropus is altogether remarkable; it is very wide, particularly in front, and its walls are clearly differentiated as in the mandibles of anthropoids and as in that of Piltdown Man. As usually occurs in the lower jaw of anthropoid apes, the mental nerves escape by four foramina.

One Outstanding Feature.

Altogether the characters of Sinanthropus are such as we expect to find in an ancestral stage in the evolution of modern man. Only one feature makes me hesitate in placing him on the line of our ancestry. That is the large size of the pulp cavities of the molar teeth. Sinanthropus shows a considerable degree of that enlargement of the body of the molar teeth and of the contained pulp, known as taurodontism—about the same degree as is seen in the ancestral stage of Neanderthal man revealed by the Heidelberg jaw. Taurodontism reached its climax in the later forms of Neanderthal man. The molar teeth of modern man are not taurodont; they are the opposite; like those of anthropoid apes, they are "cynodont." The bodies of the teeth of modern man are low, and the pulp cavities are shallow. Prof. Davidson Black recognises the taurodont nature of the sinanthropic molars, and inclines to the opinion that taurodontism is a mark of early humanity. I cannot share this opinion; to me taurodontism is a form of dental degeneration. I cannot conceive that once this taurodont change had set in the process could have been reversed and cynodontism regained. Hence my difficulty regarding the position of Sinanthropus in the human family tree. I would place him right in a central position at the base of the branch which has given birth to modern races were it not for this feature of his molar teeth. If he is not to be given a position in the direct line of our descent, we must, to account for such characters as we now know he possessed, at least place him at the pleistocene root of the modern branch, and very nearly on the direct line of neanthropic descent.

The Peking discovery reflects credit on all concerned—on Prof. Davidson Black, Dr. J. G. Andersson, Dr. O. Zdansky, and Dr. B. Bohlin. Especially must we recognise the enlightened enthusiasm which brought to their aid the Geological Survey of China, the Peking Union Medical College, and the Rockefeller Foundation.

DONATIONS AND BEQUESTS.—Mr. J. R. Macfie, Glasgow, left £500 each to the Royal Cancer Hospital, and the Association for the Relief of Incurables in Glasgow and the West of Scotland.—Among other bequests the late Dame Edith Jane Durning-Lawrence left her library ultimately to the University of London and £10,000 to University College, with the request that this bequest should be applied in connexion with the equipment of the Physical and Electrical Chemistry Laboratory at that College, but if such be already completed, then for the endowment fund, of which the income should be used in connexion with research in medical sciences in the said College and its research laboratories; £10,000 to the University of London for the endowment of a professorship or chair at University College for the teaching of medicine according to the principles laid down by Hahnemann, the first occupant of such chair to be Dr. John Weir, if he should be willing to accept such office. If, however, the University does not accept this bequest, it is to revert to the British Homœopathic Association (Incorporated); £10,000 to the Victoria University, Manchester, for a John Benjamin Smith Fund as a memorial of her late father; £10,000 to the University of Liverpool for a Durning-Lawrence Memorial; £8000 to the London Homœopathic Hospital, Great Ormond-street, W.C.; £5000 each to the London Hospital and King Edward's Hospital Fund for London; £4000 to the Royal Waterloo Hospital for Children and Women, Waterloo-road, S.E.; £1000 to King Edward VII. Hospital, Windsor; and £200 to the Royal Victoria Nursing Home, South Ascot.

THE MEDICAL REGISTER: UNTRACEABLE PRACTITIONERS IN 1929.

WE are requested by the Registrar of the General Medical Council to publish the following list of medical practitioners who have not replied to his inquiries as to the accuracy of their addresses. Anyone, wherever resident, who finds his or her name included in this list should communicate immediately with the Registrar of the General Medical Council, 44, Hallam-street, Portland-place, London, W. 1, otherwise the name will be omitted from the next issue of the Medical Register. There may be some who have answered while this list is in the press. Those marked "(S)" should communicate direct with the Registrar of the Scottish Branch Council, 12, Queen-street, Edinburgh.

Abdel-Khalik, Ahmed K., M.R.C.S., 1925(E).
Allen, Charles P., M.B., 1925(E).
Armstrong, George R., L.K.Q.C.P., 1876(I).
Ashkenny, Roy F., L.M.S.S.A., 1925(E).
Atkinson-Fleming, Frederick C., *M.C.*, M.B., 1914(I).
Attale, Errol E. E., L.M.S.S.A., 1923(E).
Avetoom, Sarkies T., L.R.C.P.S., 1879(S).

Bailey, William H., L.S.A., 1884(E).
Barclay, Ruth M. C., M.B., 1927(Col).
Begg, Alexander C., *O.B.E.*, M.B., 1901(S).
Bickerton, John M., M.B., 1903(E).
Blackmore, William T. E., M.R.C.S., 1925(E).
Braham, George N., *M.C.*, L.R.C.P.S., 1909(S).
Bogan, James H., L.R.C.S., 1888(I).
Burke, Edmund T., *D.S.O.*, M.B., 1914(S).
Burt, Alida C., M.B., 1921(I).

Casalis de Pury, George A., M.B., 1918(S).
Clark, Walter I. M., M.B., 1906(S).
Coates, Ida, M.B., 1923(E).
Coffey, Thomas, L.R.C.P., 1919(I).
Contractor, Ardeshir K., M.B., 1910(E).
Corry, Matthew, M.B., 1896(S).
Cuthbert, John, L.R.C.S. ,1885(I)

Dalal, Anandrai K., *O.B.E.*, M.R.C.S., 1911(E).
Dalal, Kharshedji A., M.B., 1875(S).
Dalzell, John M., L.R.C.P.S., 1912(S).
Danis, James T., M.C.P. & S., 1925(Col).
De Kok, Winifred M., M.R.C.S., 1926(E).
Dempsey, George A., M.B., 1922(I).
Dickinson, Charles M., M.R.C.S., 1905(E).
Dickinson, Thomas E., M.B., 1910(I).
Dimond, John L., M.B., 1900(E).
Duff, Howarth, M.B., 1924(E).
Dunbar, Gladys M. C., M.B., 1908(E).

Early, Edmund P. N. M., M.B., 1926(I).
Edwards, John A., M.R.C.S., 1927(E).
Ekins, Charles M., L.R.C.P., 1900(E).
Eland, Arthur J. C., M.R.C.S., 1923(E).
Ellis, George, L.R.C.P.S., 1892(E).
Enright, Maurice H., L.R.C.P.S., 1896(S).
Enright, Ruby, M.B., 1925(Col).
Evans, Grace O. D., L.R.C.P.S., 1921(S).

Falconar, William E., M.B., 1905(E).
Ferguson, Francis J., M.B., 1922(I).
Fernando, William H., L.M.S., 1921(Col).
Fitzsimons, James, M.B., 1926(Col).
Fleming, Evelyn M., M.C.P. & S., 1926(Col).
Fletcher, Leslie, M.R.C.S., 1893(E).
Ford, John C. C., L.R.C.P., 1899(E).
Forsyth, William D., M.B., 1891(S).
Frend, John A., L.R.C.S., 1877(I).

Ghose, Fokeer C., L.R.C.P.S., 1868(S).
Gibb, Edward A., M.R.C.S., 1918(E).
Gillespie, James, L.A.H., 1906(I).
Gray, Kate, M.B., 1920(E).
Green, Samuel L., M.R.C.S., 1914(E).
Griffith, William R., L.R.C.P.S., 1908(S).
Griffiths, Alfred T., L.R.C.P.S., 1898(S).

Harper, Frank S., M.B., 1897(S).
Higgins, Edward J., L.A.H., 1920(I).
Huxtable, Richard R., M.R.C.S., 1905(E).

Jackson, David, L.R.C.P.S., 1898(I).

Keith, Thomas S., M.R.C.S., 1912(E).
Kennedy, William W., M.R.C.S., 1891(E).

Lambert, John S., M.R.C.S., 1878(E).
Lautre, Max A., M.R.C.S., 1923(E).
Lewtas, Frederick G., M.R.C.S., 1919(E).
Lynch, Eugene G., M.B., 1926(Col).

McCreery, Arthur L., M.B., 1915(I).
McGrigor, Henry J., M.B., 1898(S).
McIvor, William J., M.B., 1905(I).
Maclurkin, Alfred R., M.B., 1900(S).
McMillan, Frederick W., M.B., 1914(S).
McPherson, George, *C.I.E.*, M.B., 1895(S).
Magner, James, L.R.C.P.S., 1916(I).
Massy-Westropp (Mrs.), Gladys (formerly Weatherill), M.B., 1923(I).
Miller, Ralph S., M.B., 1883(S).
Minchin, Edward J., L.R.C.S., 1884(I).
Mitter, Robert K., L.R.C.P.S., 1888(S).
Morton, Frank A., M.B., 1927(Col).
Muhammad Din, Khan, M.B., 1925(Col).
Murphy, Timothy M., M.B., 1922(I).

Nasmyth, Roy D., M.C.P. & S., 1920(Col).
Newton, Henry A., L.R.C.P.S., 1925(S).

O'Kelly, Robert, L.R.C.P., 1907(I).
O'May (Mrs.), Lily S., M.B., 1909(S).

Patchett, Reginald J., L.R.C.P.S.,1918(S).
Patterson, Edward C., M.B., 1921(I).
Paul, William M., L.R.C.P.S., 1899(S).
Pearse, Patrick S., L.R.C.P.S., 1897(S).
Perry, Arnold, M.B., 1925(Col).
Peyton, Thomas H., *D.S.O.*, M.B., 1906(I).
Port, Arthur W., M.B., 1893(E).
Prendergast, D'Arcy J., M.C.P. & S., 1925(Col).
Price, Alfred R., M.B., 1908(S).
Pryce, Daniel M., M.R.C.S., 1926(E).

Radich, John P., M.B., 1927(Col).
Raymond, James, M.R.C.S., 1925(E).
Reece, Charles, M.B., 1904(S).
Rees, Evan R., M.R.C.S., 1927(E).
Rees, Samuel, L.R.C.P.S., 1899(S).
Reeves, Thomas S., L.R.C.P., 1904(I).
Reid, Edmund L., *M.C.*, M.B., 1910(S).
Riad, Mohammed M., M.R.C.S., 1923(E).
Roberts, Frederick E., M.B., 1925(E).
Roberts, Llewellyn W., M.B., 1895(Col).
Roberts, Hugh C., M.R.C.S., 1893(E).
Robinson, John H., L.A.H., 1909(E).
Robinson, Lilian E., M.R.C.S., 1924(E).
Rodger, Nora A. M., M.B., 1923(S).
Ross, William G., M.R.C.S., 1873(E).
Rowland, Frank, L.R.C.P.S., 1899(S).
Rowlands, Annie E. G., M.R.C.S., 1925(E).
Russell, Audrey E., M.R.C.S., 1926(E).
Russell, Edmond F. B., L.R.C.S., 1887(I).
Rustomjee, Maneeksha, L.R.C.P.S., 1925(S).
Ryan, William J., L.R.C.P.S., 1888(S).

Sabri, Ahmed, M.R.C.S., 1914(E).
St. Johnston, Adrian, M.R.C.S., 1914(E).
Segal, Kailash N., M.B., 1927(Col).
Shore, Lewis R., *M.C.*, M.R.C.S., 1913(E).
Simmonds, Francis M., L.S.A., 1898(E).
Simpson, Edwin, L.R.C.P., 1882(I).
Singer, Kildare L., M.R.C.S., 1917(E).
Smart, Thomas W., M.B., 1914(S).
Smith, Gerard H., M.R.C.S., 1876(E).
Smith, John K., M.B., 1914(S).
Smithies, Cyril M., M.B., 1921(E).
Sortain, Edwin L., M.B., 1889(E).
Steel, Henry G., L.M.S.S.A., 1912(E).
Stephen, Leslie D., M.B., 1909(S).
Strachan, Alan, M.B., 1917(S).

Thain, William B., M.B., 1897(E).
Thomas, John G. S., B.M., 1925(E).
Thomas, Rufus C., M.R.C.S., 1915(E).
Thomas, William, L.R.C.P.S., 1893(S).
Tredinnick, Ernest, M.R.C.S., 1876(E).
Trimmer, Francis I., L.S.A., 1902(E).
Trist, George M., M.R.C.S., 1919(E).
Tschessno, Ovsey, M.D., 1927(For).
Tugman, Mary C., M.R.C.S., 1926(E).

Uttley, William W., M.R.C.S., 1909(E).

Vaithialingham, Vethabanam, L.R.C.P.S., 1925(S).
Vatve, Gopal G., L.R.C.P., 1894(E).

Wadham (Mrs.), Elspeth V. D. (formerly Hewatt), M.B., 1925(I).
Wall, Kathleen G., L.R.C.P., 1913(I).
Walshe, Denis, L.R.C.P., 1871(I).
Waters, J. F. W., M.R.C.S., 1897(E).
Watkinson, Arthur A., M.R.C.S., 1917(E).
Watson, Frank H. C., M.B., 1912(S).
Weaver-Bridgeman, Harry M., M.R.C.S., 1891(E).
Whitcombe, Ernest G. R., L.R.C.P.S., 1889(S).
Will, William M., M.B., 1911(S).
Williams, John F., M.B., 1926(Col).
Willis-Bund, Henry D. H., *M.C.*, M.R.C.S., 1906(E).
Wilson, James D., L.R.C.P.S., 1899(S).

Young, Campbell, M.R.C.S., 1916(E).

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Comdr. W. P. Hingston is placed on the Retd. List with rank of Surg. Capt.

Surg. Capt. R. W. G. Stewart is placed on the Retd. List.

S. Jenkinson and N. J. U. Mather to be Surg. Lts.

The following appointments are notified: Surg. Lt.-Comdr. (D.) C. Williams to *Pembroke*, for R.N. Barracks, Chatham; Surg. Lts. E. E. Malone and G. A. Miller transferred to Permanent List.

ROYAL NAVAL VOLUNTEER RESERVE.

Surg.-Comdr. T. B. Dixon is appointed Admiralty Surgeon and Agent for Bristol.

ROYAL ARMY MEDICAL CORPS.

Maj.-Gen. H. B. Fawcus to be Lt.-Gen., and to be Dir.-Gen., Army Med. Services, War Office.

Lt.-Gen. Sir M. H. G. Fell retires on ret. pay.

Maj.-Gen. Sir A. P. Blenkinsop, retd. pay, is apptd. Col Comdt., vice Maj.-Gen. Sir M. W. O'Keeffe.

Col. W. R. Blackwell to be Maj.-Gen., vice Maj.-Gen. H. B. Fawcus.

Maj. F. C. Atkinson-Fleming is placed on the half-pay list on account of ill-health.

Capt. H. G. P. Armitage to be Maj.

ROYAL AIR FORCE.

Flight Lt. J. Hill is granted a permanent commission in this rank.

Flying Officer G. T. O'Brien is promoted to the rank of Flight Lt.

Squadron Leader J. H. Peek relinquishes his short service commission on account of ill-health and is permitted to retain his rank.

INDIAN MEDICAL SERVICE.

Maj. S. Gordon retires.

Capt. Bodh Raj Chaudhri to be Maj.

Temp. Capt. Bhalchandra Kondopant Phatak and Temp. Lt. Jaswant Singh Anand relinquish their temp. commns.

Public Health Services.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

THE following are some 1928 statistics of six administrative counties :—

Name of district and estimated (R.-G.) population.	Birth-rate.	Death-rates per 1000 of the population.					Death-rates per 1000 births.		
		All causes.	Tuberculosis.	Cancer.	Respiratory diseases with influenza.	Heart disease.	Infant and neonatal mortality.	Young child (1–5 yr.) mortality.	Maternal mortality from childbirth.
Surrey .. .. (841,090)	14·2	10·2	0·66	1·53	1·2	1·7	47	21	4·9
Wiltshire .. (301,200)	15·7	10·8	0·61	1·64	1·1*	2·0	46	—	3·9
Norfolk .. (322,300)	16·4	12·1	0·73	1·76	1·2	2·0	56	17	2·8
Leicestershire (291,800)	17·4	10·5	0·88	1·21	1·2	1·7	55	19	4·7
Northamptonshire (215,170)	14·7	11·6	0·8	1·6	1·4	2·2	48	16	5·6
Holland .. (88,860)	20·6	11·2	0·71	1·56	1·4	1·5	46	19	4·4

* " Other respiratory diseases " not included.
— = Figure not available.

Surrey.

Dr. Andrew Davidson (deputy) presents the report and mentions as a notable feature the opening of the county sanatorium at Milford. On several occasions during 1928 the Surrey tuberculous patients in various hospitals and sanatoriums exceeded 400 in number. The new sanatorium accommodates 300, with two 50-bed pavilions for advanced and four 50-bed pavilions for intermediate and early cases. The site covers 110 acres in healthy open surroundings in the Guildford and Hambledon rural districts about 230 ft. above sea-level with a gentle slope to the south. The sanatorium was opened by the Minister of Health on July 20th, 1928. Over 200 patients were admitted during 1928, and by May, 1929, the institution was full. There were two outbreaks of small-pox—one in January of seven cases and a second in April of 22 cases. In both instances the infection appears to have been introduced by tramps. During the third quarter there was an outbreak of paratyphoid B, chiefly localised in the Epsom neighbourhood. The outbreak was synchronous with that which occurred in Kensington, and the M.O.H. of Carshalton and Epsom considered the probable source of infection was the cream-supply to which the London cases were traced.

The sum paid by the county council to doctors called in by midwives amounted to £1235 16*s.* 9*d.*, of which £335 16*s.* was afterwards recovered from the patients. There were 169 notifications of puerperal fever and pyrexia, and 17 of the patients were admitted to hospital. The county council subsidises various maternity homes to which patients seen at the antenatal clinics by an assistant county medical officer are admitted. During 1924 54 such patients were admitted, and this number has increased year by year to 219 in 1928. In addition to this the number of expectant mothers visited by the council's health visitors was 974, the total births in the administrative county being 11,911. A scheme for the dental treatment of expectant and nursing mothers will be in full operation in 1929. The children under 5 who received treatment for crippling defects at the five orthopædic centres in the county numbered 239. The number of new V.D. cases from Surrey dealt with under the London scheme was 773, and for the accommodation of patients in the more remote parts of the county V.D. clinics are in existence at Guildford and Redhill, and it is hoped that the clinic at the Royal Hospital, Richmond, will be re-established during 1929.

At the beginning of the year the county council had appointed a chief veterinary officer to deal with milk control and the Diseases of Animals Acts, and in March three full-time assistant veterinary surgeons were appointed. The number of the part-time veterinary staff has been reduced from eight to seven. In 15 instances complaints of tuberculous milk were received from outside sources. In one case the milk, though sent out from a Surrey dairy, was entirely produced in another county. Of the remaining 14 cases, 12 of the infected samples came from one farm, 1 from two farms, and 1 from three farms. In 7 of the 14 cases one or more cows were found suffering from tuberculosis and slaughtered. The veterinary staff carry out a quarterly inspection of the herds, which comprise nearly 15,000 cows in milk. Among the cows in milk they found in 1928 147 suffering from tuberculosis, of which 45 had tuberculosis of the udder.

At the end of 1928 711 blind persons were on the register, of whom 225 were employed and 402 unemployable. The county council augments the wages of blind home workers through the National Institute to the extent of 5*s.* per week, the total sum paid under this heading being £502 0*s.* 10*d.* It is considered that the provision of free wireless licences and the regular supply of Braille and Moon literature and music increases the readiness of blind persons to register under the Act.

Wiltshire.

Dr. Claude E. Tangye mentions that the staff has been strengthened by the appointment in August of Dr. J. B. Lowe as deputy M.O.H., and that his time has largely been occupied with the small-pox outbreak in the Swindon neighbourhood, which still continues (April, 1929). A deficiency in the tuberculosis scheme mentioned in the last report has been met by the appointment of Dr. P. StJ. Wilkinson as tuberculosis officer for the Swindon area, for which he already acts as V.D. medical officer. The county is well provided with isolation hospitals, but with modern ambulance facilities the number of these could be reduced with advantage. In spite of local opposition a ministerial inquiry was held early in 1929 with regard to a new water-supply for Ashton Keynes. The existing wells are polluted and are held responsible for the infection of the school-children by intestinal worms. The water-supply of Long Newnton has apparently caused cases of paratyphoid fever in that parish. A chlorination plant has been installed with satisfactory results, but the rural district council is being urged to provide a satisfactory permanent new supply. The analysts' reports on 34 sewage effluents showed 18 good results, five bad, and the remainder intermediate. Up to March 31st, 1929, financial assistance amounting to £3209 had been promised by the county council in respect of 37 premises under the Housing (Rural Workers) Act, 1926. At the same date £1319 had been paid for work completed at 14 dwellings, and in ten other instances the work was in hand.

The outside complaints of tuberculous milk numbered 15. In three instances the milk was consigned to London in bulk from large collecting depôts in the county, and in view of the large numbers of farms involved complete veterinary inspection was found to be impracticable. The remedy appears to be continuous sampling at the depôts of the produce of individual farms. The following-up of the remaining 12 infected samples resulted in the discovery of tuberculous cows in the case of 10 of the 12 herds inspected. Dr. Tangye expresses doubt as to the value of inspecting herds when the guinea-pigs die from acute infections other than tuberculosis. The work involved is considerable, and it frequently happens that nothing definite is discovered at the farm to account for the deaths of the guinea-pigs.

The county council pay midwifery subsidies to 81 nursing associations, and in two cases subsidies to

individual midwives to enable them to attend cases in isolated parishes. Most of the midwives now possess pelvimeters for antenatal work supplied at reduced price through the county council. The county council paid £793 in midwifery fees to doctors and recovered £306 from the patients. The county orthopædic scheme, based on the Bath Hospital and with five out-clinics, is working successfully, and dealt with 1049 new cases as compared with 873 in the previous year. The scheme is being extended by the institution of remedial exercise classes at the schools in order to provide early corrective treatment for defects of posture. The education committee also has under consideration a comprehensive plan for the occupational training of cripples.

Norfolk.

Dr. T. Ruddock-West, who only took over his duties on June 1st, mentions that before the close of the year he had held conferences with the various district medical officers of health in order to discuss the needs of the county. Isolation hospital accommodation is inadequate, and a central hospital is indicated as the best means of serving unprovided areas. There were 42 cases of small-pox notified with two deaths. Forty-one of the cases occurred in the borough of King's Lynn. The county council is responsible for maternity and child welfare work for the administrative county, with the exception of King's Lynn, Swaffham U.D., and Forehoe R.D., and Dr. Ruddock-West thinks the notification of births should be made direct to the county M.O.H. In 165 of the 690 parishes no provision has yet been made for infant health visiting. There are seven child welfare centres established by the British Red Cross Society, which receive subsidies from the county council. There are, in addition, a number of smaller unsubsidised centres established by voluntary agencies, such as local nursing associations. Antenatal clinics are indicated as one of the needs. Eight outside complaints of tuberculous milk were received and investigated by the (part-time) veterinary officer. As a result six cows were slaughtered under the Tuberculosis Order. As the result of an adverse report by the Fishmongers' Company with regard to Hunstanton mussels marketed in London, samples of mussels, water, and mud were taken on Nov. 30th and examined in the county laboratory. The mussels proved to be 70 per cent. clean, and certain suggestions were made with regard to the discharge of sewage. Further samples of mussels examined by the Fishmongers' Company were found to be clean.

Leicestershire.

Dr. J. A. Fairer says that the total estimated increase of the county population during the last two years—viz., 12,100—is largely due to the migration of city dwellers to houses recently built in the surrounding districts. The recovery of the mining district in the north-west, after the coal stoppage of 1926, is slow and uncertain, and unemployment and distress are reflected in defective nutrition among the children. In the industrial district of the south-west the absence of the mother from her home does not apparently affect the children, and the infant mortality-rate for Hinckley was only 30·5 per 1000 births. Maternity and child welfare work was originated in the county by voluntary societies, and with a view to obtaining better medical supervision Dr. Constance Walters was appointed county medical officer for infant welfare during the year. There are now 39 centres under the administrative control of the council. Antenatal supervision is chiefly carried out by the county health visitors. There are a considerable number of hospitals and clinics at which orthopædic work is done, but up to now it has not been possible to institute a coördinating scheme by which a continuous and accurate record of each child will be kept. The county council has appointed Dr. J. M. Mackintosh to conduct the investigation into maternal deaths required by the Ministry. Dr. E. L. Lilley has repeated his successful series of lectures to the county midwives. The county council subsidises nursing associations for midwifery services in six sparsely populated areas. The midwifery fees paid to doctors totalled £314 2*s.*, of which £175 16*s.* was recovered from the patients.

Dr. Fairer reports a considerable improvement in the condition of nearly all the sewage farms adversely reported upon last year. Grants were made amounting to £1015 in respect of 13 dwellings under the Housing (Rural Workers) Act, 1926. The outside complaints of tuberculous milk numbered 13. As a result 277 cows were inspected, the milk of 33 individual cows was examined bacteriologically, and seven cows were dealt with under the Order. The informal bacteriological examination of milk is apparently improving the standard of cleanliness; thus the percentage of "good" samples during the last three years has been 46·7, 47·1, and 58·8. The plans for the proposed new county sanatorium are nearing completion.

Mild small-pox made its appearance at the close of 1927, and during 1928 there were 25 cases, the last notified on Nov. 24th, with no deaths. There were 18 cases of ophthalmia neonatorum, in two of which vision was impaired.

Northamptonshire.

Dr. L. Meredith Davies records the occurrence of 20 cases of small-pox, chiefly among tramps. There were epidemics of diphtheria in Desborough U.D. and Crick R.D., and the county medical staff gave assistance in both cases in the tracing of contacts and the detection of carriers. A worker in a tannery contracted anthrax. The pustule was excised and he was also treated with Sclavo's serum and made a good recovery. There were 17 notifications of puerperal fever with four deaths. All the cases except one were sent into hospital and a special nurse was provided in one case before removal. There were 30 notifications of puerperal pyrexia, and no request for a special nurse was received for the 23 cases occurring in districts other than Kettering U.D. Four hospitals have been made available for the treatment of women suffering from these diseases. There were 21 notifications of ophthalmia neonatorum, and in one case both eyes were damaged. Arrangements have been made with three hospitals for the admission of both mother and baby and also for the supply of a special nurse. The county council make grants to three isolation hospitals, at Daventry, Kettering, and Oundle. Daventry Hospital has many needs. It has no trained nursing staff, no ambulance, and a very old type of disinfector. Kettering Joint Hospital has just been extended and improved. Oundle Joint Hospital treats so few cases (viz., 15 in 1926, 8 in 1927, and 1 case of small-pox for the first six months of 1928) that Dr. Davies considers its continuance is unjustifiable and that the board should unite with another district.

A scheme for tuberculosis care committees has been approved and will come into operation on April 1st, 1929. There will be one representative central committee and six area committees. Marked benefit is reported from light treatment for suppurating tuberculous glands and less notable benefit in glands without suppuration and lupus. The county council financed the admission of one patient to Papworth Colony. The claims received from medical practitioners called in by midwives numbered 113; the payments made amounted to £167, of which £54 was recovered from patients. Under the heading "Rivers Pollution" Dr. Davies gives extracts from the reports made on the conditions found at many sewage farms. The result may be summarised as "bad" in 24 cases, "good" in 4, and "intermediate" in 14. The investigation of six outside complaints of tuberculous milk resulted in the discovery of one tuberculous cow only. From Feb. 1st for 18 months an inspection of dairy cattle twice in each year by (part-time) veterinary surgeons came into force. As a result 29 tuberculous cows were found, including those with the udder affected. The veterinary surgeons are also appointed sanitary inspectors, and thus empowered to deal with unsatisfactory conditions found on the farms.

Holland.

Dr. H. C. Jennings reports that the work done in the county laboratory has been of great benefit, but would be of much wider service if a trained assistant were appointed. There were 26 cases of small-pox with no deaths. In 12 of the cases in Spalding infection was traced to a tramp. There were 12 notifications of ophthalmia with one case of impaired vision removed from hospital against medical advice. There were 52 deaths from pneumonia, and Dr. Jennings would like to have hospital treatment for all pneumonia cases. Two cases of encephalitis were notified and both died. The tuberculosis mortality was the lowest ever recorded; 355 new cases were reported and 184 contacts were examined. The 30 shelters available in the county were used by 46 patients during the year. More local nursing associations are needed to ensure adequate attention to mothers in childbirth. As it is, the problem of the "handywoman" is an ever-present one. The amount paid in fees to practitioners called in by midwives was £88 18*s.*, of which £9 5*s.* was recovered from patients. The public analyst reports a sample of egg powder as "inferior." It consisted of starchy matter and a small amount of baking powder, and was coloured with an aniline dye. There is, however, no accepted definition or standard for egg powder. Under the Tuberculosis Order 86 animals were slaughtered, four of which were cows in milk with tuberculosis of the udder. Several of the districts in the south of the county have unsatisfactory water-supplies and are in negotiation with the Spalding U.D.C., which own bores at Bourne, from which an ample supply of pure water is obtained. In an appendix on the isolation hospital accommodation of Holland Dr. Jennings indicates that the ideal would be to erect one hospital in a central situation to serve the whole county. Unfortunately, the lack of a piped water-supply in the greater part of the area very much limits the choice of suitable sites.

MENTAL HOSPITAL REPORTS.

THE *Devon Mental Hospital* issues this year its eighty-third annual report, illustrated by two photographs, one of the ballroom and the other of the female private ward, made gay by a veritable herbaceous border of hand-made floral decorations. There were 1333 patients on the register on Dec. 31st, 1928, an increase of 110 during the year, so that on the female side the hospital is now overcrowded and in urgent need of extension. The increase in the admission-rate is largely due to the reception of patients on contract from Staffordshire, Birmingham, and Plymouth. These were chronic cases, yet the recovery-rate for the year reached 37·82 per cent. The death-rate was 7·6 per cent., and autopsies were held in all cases where permission could be obtained—72·34 per cent. The number of cases of pulmonary tuberculosis has been reduced by improved diet, and by ultra-violet ray and sanatorium treatment. In the autumn there were three cases of dysentery, but there has been no typhoid since the routine inoculation of all patients with "TAB" was instituted. The laboratory carried out a large number of routine and special examinations; the dentist visited fortnightly and examined 636 patients, and the visiting ophthalmic surgeon made 76 examinations. The visiting surgeon paid 40 visits, saw 107 cases, and performed 29 major operations. The visiting radiologist made 59 investigations, and 35 patients were treated in the light department. During the year 13 men and 2 women suffering from general paralysis were treated by malaria, 7 by mosquitoes, and 8 by direct inoculation of malarial blood. Three of the patients were sent home, 4 showed no appreciable change, and 4 died. In future, arsenical preparations are to be given as well as malaria, and the results will be compared with those following malarial treatment alone. Parole within the estate was granted to 80 patients; 46 were allowed outside and 55 were taken out by friends. As far as possible the open-door system is adopted. Char-à-banc picnics were enjoyed by 518 patients, and daffodil, primrose, and blackberry-picking parties were organised. The sum of £170 was raised at the annual patients' sports. The method, devised by the engineer, whereby the wireless can be transmitted through the telephone system, continues to work satisfactorily, and there is a portable set for wards not supplied with a telephone. The library has been completely reorganised in a central room, and the weekly illustrated papers are now circulated in folios made in the bookbinding department of the printers' shop. Bookbinding occupies two patients, weaving five, net-making three, and mat-making two. The brush- and basket-making department, served by eight patients, has turned out excellent work, and knitting, rug-making, and raffia occupy some of the women. In all, 271 patients have useful employment. At the out-patient clinic there were 63 attendances, nearly twice as many as in 1927. A new sterilising room was added to the operating theatre, and two new cottages were built for the male nursing staff. One nurse passed the final examination of the General Nursing Council, and 12 nurses and two attendants obtained their R.M.P.A. certificate.

The *Roxburgh, Berwick, and Selkirk District Asylum* had 368 patients, including four voluntary boarders, in residence on May 15th, 1929. The recovery-rate was 35·2 per cent. and the death-rate 7·9 per cent. Cause of death was verified by autopsy in 17 cases. During the year the hospital was fortunate in admitting more recoverable and fewer senile cases than usual. Apart from a sharp epidemic of influenza the health was excellent. The dental surgeons visited every fortnight. An occupational therapy class has been started, and a kinematograph apparatus has been installed. Thirteen members of the staff sat for the R.M.P.A. examination, and all but one were successful.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED SEPT. 14TH, 1929.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 96 (last week, 150); scarlet fever, 2015, diphtheria, 1160; enteric fever, 113; pneumonia, 569; puerperal fever, 50; puerperal pyrexia, 90; cerebro-spinal fever, 13; acute poliomyelitis, 12; acute polio-encephalitis, 3; encephalitis lethargica, 14; continued fever, 1; dysentery, 4; ophthalmia neonatorum, 119. No case of cholera, plague or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the Metropolitan Asylums Board on Sept. 17th–18th was as follows:—Small-pox, 121 under treatment, 15 under observation (last week 156 and 14 respectively); scarlet fever, 1417; diphtheria, 1524; enteric fever, 21; measles, 243; whooping-cough, 209; puerperal fever, 23 (plus 6 babies); encephalitis lethargica, 125; poliomyelitis, 3; "other diseases," 25. At St. Margaret's Hospital there were 22 babies (plus 10 mothers) with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns, including London, there was no death from small-pox, 3 (3) from enteric fever, 9 (2) from measles, 2 (0) from scarlet fever, 27 (4) from whooping-cough, 24 (2) from diphtheria, 103 (17) from diarrhœa and enteritis under two years, and 22 (2) from influenza. The figures in parentheses are those for London itself.

Of the deaths from diarrhœa (which have increased by one-third), 8 were reported from Liverpool, 7 from Gateshead, 6 from South Shields, 5 each from Birmingham, Hull, and Middlesbrough, 4 from Leeds; while Glasgow, Dublin, and Belfast, reported 7, 5, and 5 respectively. Two deaths from measles were reported from Stoke-on-Trent.

The number of stillbirths notified during the week was 265 (corresponding to a rate of 42 per thousand births), including 40 in London.

Correspondence.

"Audi alteram partem."

THE RELATION OF THE TONSILS TO RHEUMATIC CONDITIONS.

To the Editor of THE LANCET.

SIR,—The suggestive paper by Dr. Gray Hill in your issue of Sept. 14th (p. 571) upon the value of tonsillectomy in acute rheumatism, rheumatic carditis, and chorea raises the important question of the true relation between the tonsils and rheumatic conditions, and makes us ask ourselves whether we are not pursuing a chimera, and that it is necessary to pause and reconsider carefully the position. The tabulated cases upon which Dr. Hill's contention is based seem clearly to demonstrate that tonsillectomy, even when efficiently performed, has no influence upon the behaviour of rheumatism and is no safeguard against carditis or chorea, an opinion which supports those of Poynton, Vining, Hunt, Osman, MacSweeney, Boas, Schwartz, and Wilson as against the too enthusiastic assertions of Schichhold, Robey, Freedman, Kerby, Miller, and Thomson.

I think that many practitioners of experience will endorse me when I say that, apart from a certain general improvement that must necessarily accrue from the removal of a definitely septic focus, tonsillectomy has no influence upon the incidence or course of any rheumatic condition, either acute or chronic. This being so, it behoves us to look further afield, and to search for a more likely reason for the undoubtedly frequent concurrence of septic tonsils in rheumatic cases, and one which will also give us more certain indications for treatment. The first suggestion that occurs is that the rheumatic condition is not dependent upon the tonsil sepsis, but that both are in fact the result of a source of infection situated elsewhere.

I personally believe that the most frequent source of rheumatism, septic tonsils and septic teeth, lies in the chronic toxæmia which results from chronic intestinal intoxication. Research should lie in the direction of establishing a possible connexion between rheumatic conditions, or septic tonsils, or both, and the various pathogenic organisms occurring in intestinal toxæmia. Such a connexion would tend to give indications for prophylaxis and rational treatment.

I am, Sir, yours faithfully,
MACLEOD YEARSLEY.

Wimpole-street, W., Sept. 19th, 1929.

DISPLACEMENT OF THE MANDIBULAR CARTILAGE.

To the Editor of THE LANCET.

SIR,—I have long been interested in the subject of the displacement of the mandibular cartilage discussed by Mr. Wakeley in your columns on Sept. 14th. I had to do with two patients of the late Prof. Annandale who was the first surgeon to treat recurring displacement of this meniscus by operation, as he was the first to operate for "displaced semilunar cartilage" of the knee-joint. A more intimate reason for my interest in this unusual accident was my personal experience of the extreme discomfort it can cause. I found a method by which I could reduce the displacement by manipulation. Ten years ago I contributed to the *British Journal of Surgery* (1919, vi., 385) an article designed (1) to make clear that the description of the meniscus in our anatomical text-books was not a correct one; (2) to indicate by original diagrams what I believed to be the characteristic shape and appearance of this structure; (3) to describe the sensations and symptoms which result from a recent displacement and how I conceived them to be brought about, as well as to describe my method of reduction by manipulation; (4) to record a case of constantly recurring displacement which I treated in 1911 by excising the meniscus. Mr. Wakeley's account of the condition does not appear to differ in any particular respect from my own, and it is gratifying to observe that the method which he describes as being "the best method of reduction" is that recommended by me. It is unusual to find one's statements on a subject in surgery so completely corroborated in every detail as mine have been by Mr. Wakeley without a reference to the original descriptions, especially when an accident is uncommon and has received scanty attention in the literature. However, since THE LANCET is extensively read by practitioners who may not see the more specialised journals regularly, it is all to the good that attention should be called to the condition in your columns.—I am, Sir, yours faithfully,

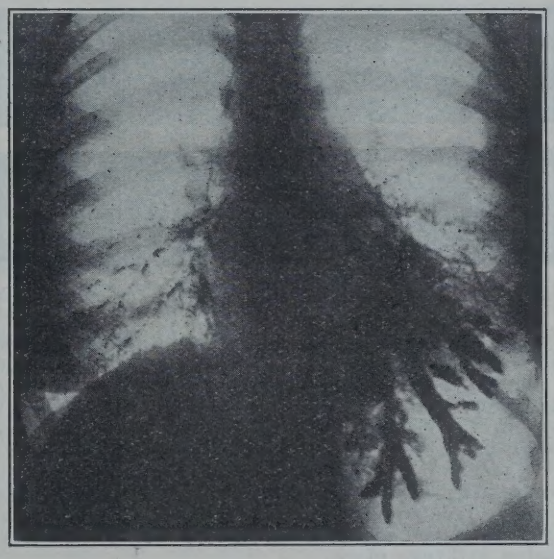
J. HOGARTH PRINGLE.

Peebles, Scotland, Sept. 16th, 1929.

RADIOGRAPHIC EXAMINATION OF THE LUNGS.

To the Editor of THE LANCET.

SIR,—On X ray examination of the lungs the bases are obscured by the domes of the diaphragm and abdominal contents. In cases of left-sided disease we give some sodium bicarbonate before the examination, in order that there may be gas in the stomach to render the bases of the lung more visible. The radiogram here reproduced shows a patient with left basal bronchiectasis and lipiodol in the dilated bronchi. It will be seen how clearly the condition shows up against the air bubble in the stomach.



Radiogram showing left basal bronchiectasis.

We are, Sir, yours faithfully,
L. S. T. BURRELL,
STANLEY MELVILLE.

Chandos-street, W., Sept. 16th, 1929.

THE AGE OF MARRIAGE AND OF CONSENT.

To the Editor of THE LANCET.

SIR,—In your leading article last week (p. 618) reference is made to the Hindu custom of early marriage. Therein is quoted a statement by Dr. Margaret Balfour and Dr. Ruth Young to the effect that this custom amongst the Hindus is founded on the principle that early marriage is likely to lead to chastity in the youth of both sexes. This statement appears to be of the nature of an *argumentum a*

posteriori, and does not seem to be very convincing, or at least is true only to a very limited extent. Is not the explanation which the Hindus themselves put forward more reasonable and more in accordance with experience—namely, that the Muslim conquerors of India took the unmarried girls only into their harems? It thus became a question of national existence and national honour that to save the girls from this abduction they should be married at an early age. In order to bring about the general acceptance of this practice religious sanction was invoked from the ancient Sanskrit texts. It is to be remembered that early marriage was already a Muslim custom. I am, Sir, yours faithfully,

Birmingham, Sept. 23rd, 1929. G. A. AUDEN.

*** Since our article appeared the Child Marriage Bill, which provides that the age of girls at marriage shall not be less than 14 years and the age of consent not less than 16 years, has passed the Indian Legislative Assembly.—ED. L.

THE STABILISATION OF "VITA" GLASS.

To the Editor of THE LANCET.

SIR,—In an annotation entitled Special Glass in School Windows in your issue of August 24th (p. 398) it is implied that "Vita" glass tends to lose its special penetrability with time. I shall be much obliged if you will allow me to correct the erroneous impression thus conveyed. When "Vita" glass is exposed to the sun it undergoes a change, which consists of a slight diminution of the transparency to the sun's rays of the shortest wave lengths. This physical change does not in any way affect the appearance of the glass and is almost invariably complete within nine months, and often within a shorter period, after glazing. This period is called the period of stabilisation, and at the end of it no further change in transmission will take place.

The effect of stabilisation is shown by the following figures which give percentage transmission of a typical piece of "Vita" glass of 2 mm. thickness at wave length 3130 A.U.

	3130 A.U.
New "Vita" glass	72 per cent.
Stabilised "Vita" glass	64 ,,

The reading at 3130 A.U. is taken because this is approximately the wave length where the maximum therapeutic strength of sunlight lies, as found by Dorno. At this wave length there is a very strong line in the spectrum from a mercury-vapour lamp, enabling the determinations of percentage transmission through the glass to be done with great accuracy.

When this state of stabilisation is reached "Vita" glass still transmits to the limit of the sun's spectrum as is shown by the accompanying spectrographs made with:

(*a*) Mercury-vapour lamp unscreened.

(*b*) The same lamp screened by fully stabilised "Vita" glass.

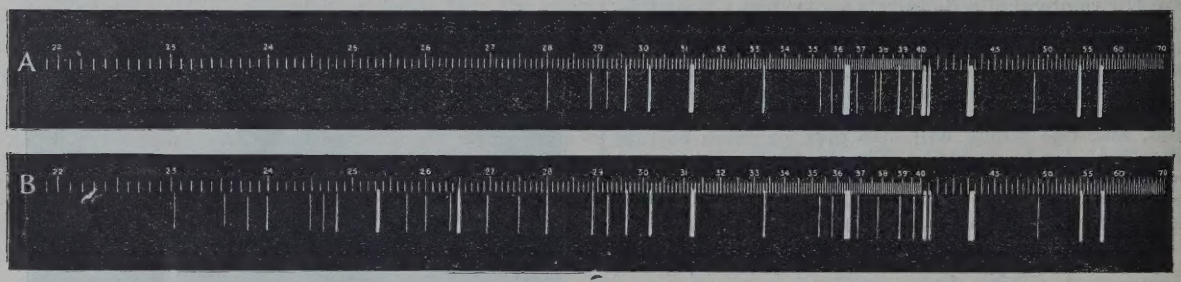
The idea that there is serious deterioration in "Vita" glass has originated through the publications of investigators who have subjected the glass to radiation from mercury-vapour lamps, which irradiate it with wave lengths far shorter than any we ever receive from the sun. It has been proved that exposure to the mercury vapour lamp is no guide to the effect of solar radiation upon "Vita" glass. The year selected for the investigation by the Board of Education was an unfortunate one, because the readings of ultra-violet radiation for the whole of these 12 months are very much below the average, and it should not therefore be assumed that because the results were not all that one could wish for, they would not be so under normal conditions.

Some of your readers will have seen by this time actual demonstrations of "Vita" glass, which go to prove conclusively that "Vita" glass admits the health-giving rays of the solar spectrum, to which ordinary glass is opaque, and I should therefore like to emphasise that all demonstrations of this kind are carried out with glass which has been completely stabilised.—I am, Sir, yours faithfully,

R. R. BYRNE,
Director, "Vita" Glass Marketing Board.

Aldwych House, London, W.C., Sept. 13th, 1929.

*** We have independent testimony that the loss in transparency when exposed to natural sunlight—briefly called solarisation—is not as great as has been made out. The current number of *Nature* (p. 441) contains a report of investigations at the Crown Glass Works at St. Helens, which show that glass which has been solarised by exposure to the quartz mercury lamp may even regain some of its lost transparency when exposed to sunlight. In America some work at the Bureau of Standards, confirmed by Dr. G. W. Caldwell and Dr. R. H. Dennett (*Jour. Amer. Med. Assoc.*, June 22nd, p. 2088), indicates that solarisation is complete in a few weeks, after which the permeability of the glass does not change. Both papers presuppose the feasibility of keeping the surface of the glass free from deposit.—ED. L.



Mercury-vapour lamp spectra: (A) screened by fully stabilised "Vita" glass; (B) unscreened.

SCHISTOSOMA BOVIS IN SOUTH AFRICA.

To the Editor of THE LANCET.

SIR,—Eight years ago you published[1] a letter from me drawing attention to the fact that *Physopsis africana* in Natal was infested with cercariæ which developed into the adult *Schistosoma bovis*. The occurrence of ova apparently identical with those of *S. bovis* in some patients who had acquired bilharzia infection, whilst bathing in pools infested with this parasite, suggested that the schistosome occasionally would choose man as its final host. Dr. E. C. Faust, who has made an exhaustive study of South Africa's larval trematodes, regards *Cercaria octadena* as the larval stage of this schistosome and observes that the cow is not necessarily the common South African host. More recent work has shown that both oxen and sheep are infested with *S. bovis* in the Eastern Province of the Cape, and the parasite would appear

[1] THE LANCET, 1921, i., 250.

to exist in the Pretoria district of the Transvaal as well as on the Natal coast.

Mr. P. L. Le Roux, of the Veterinary Department at Onderstepoort, who has been engaged in a valuable study of schistosomiasis in South African cattle and sheep, now tells me that he has observed that, where massive doses of tartar emetic are employed in the treatment of schistosomiasis, the parasites are soon found in a dying condition in various portions of the lungs. This interesting observation may explain why patients are so predisposed to temporary "colds," when larger doses than they can comfortably tolerate have been administered in the series. In the experiments which Dr. H. H. Curson, M.R.C.V.S., kindly undertook for me with freshly dissolved tartar emetic in the treatment of some fluke-infested sheep, he showed that antimonium potassium tartrate was a relatively non-toxic drug, if skilfully applied to sheep, as it is when administered to man.

I am, Sir, yours faithfully,

F. G. CAWSTON, M.D. Camb.,
late Streatfeild Research Scholar.

Durban, Natal, Sept. 3rd, 1929.

Obituary.

EDWARD PETRONELL MANBY, M.D., D.P.H. CAMB.

WE regret to record the death of Dr. E. P. Manby, a medical officer of the Ministry of Health, which took place suddenly on Sept. 20th at his house in London, just after the completion of his sixty-fifth year.

Edward Petronell Manby came of a medical family, his brother, the late Sir Alan Manby, being for many years physician extraordinary to His Majesty the King and surgeon-apothecary to the Royal Household at Sandringham. Edward received his training at Cambridge, where he graduated in 1883, and at Guy's Hospital, taking the conjoint qualification in 1886, the Cambridge M.B., B.C. in 1887, M.D. in 1891, and D.P.H. in 1894. Early in his professional career he became a resident medical officer at the Fountain Hospital of the Metropolitan Asylums Board, a post which he relinquished in 1896 on appointment as assistant medical officer of health at Liverpool. His work there did not pass unnoticed at Whitehall, and in 1900 he was invited to become a medical inspector to the Local Government Board; on the constitution of the Ministry of Health in 1919 he became a medical officer of that Department. From 1891 to 1900 he was lecturer in public health in the Liverpool University, and later in his career he held examinerships in public health in the Universities of London, Leeds, and Liverpool.

Dr. Manby's service with the central health authority extended over a period of nearly 30 years. He took his share in the routine inspection of the areas of local sanitary authorities and was entrusted with special inquiries of considerable importance, notably one into the conditions under which milk is distributed in this country. For the last ten years he had been engaged in the supervision of poor-law institutions in London and the home counties, and his special knowledge of this field of work was so valuable, especially in view of the changes occasioned by the Local Government Act of 1928, that his period of service was extended beyond the ordinary age of retirement. His life was, in fact, as one of his colleagues writes, devoted to public service, for which he had many qualifications, chiefly perhaps a robust common sense, sound judgment, and a hearty dislike of fads of all descriptions. Display and a desire for limelight had no place in his composition. He knew his job and he could do it, and he was content to let the results speak for themselves. Though he never went out of his way to court popularity he was much liked and respected by those with whom he worked. Dr. Manby was an enthusiastic golfer and lawn tennis player, and it was no easy matter to defeat him in either game, even during his last summer. He was a man of wide interests and at one time something of an authority on old furniture.

Dr. F. N. Kay Menzies writes: "Dr. Manby's sudden death is an irreparable loss to the poor-law medical service, especially of London. It is made doubly so by the fact that his old friend and colleague, Dr. Meredith Richards, was compelled to resign his position at the Ministry of Health in the spring of this year owing to serious illness. Manby and Meredith Richards knew more about poor-law medical work than any other medical men in existence, and the fact that they have both been lost to the service within the last few months is nothing less than a national misfortune. At a time like this their wide and matured experience, wise discretion, and sound judgment would have been of incalculable assistance to all those medical officers of health who will shortly be called upon to undertake responsibilities in connexion with the transfer of poor-law medical work to public health authorities. Manby's knowledge and experience of poor-law medical problems in the metropolis was profound and intimate and he was held in high esteem by the medical superintendents of the infirmaries, by whom his loss will be deeply regretted. His duties were often of a most difficult nature, requiring great patience and wisdom. He was always easily accessible, and could always be counted upon to give of his best in any direction which might be helpful to his colleagues."

Dr. Manby leaves a widow and one son.

JOHN MALLET PURSER, M.D., D.SC. DUB., F.R.C.P. IREL.

Dr. John Mallet Purser died on Sept. 18th at his residence in Dublin, being within two months of completing his ninetieth year. He had suffered some severe illnesses within the past few years, but his extraordinary vitality brought him through, and although he was somewhat enfeebled in body his mental abilities had remained unimpaired.

Purser was educated at Trinity College, Dublin, and took his medical degrees in 1863. He subsequently took the Licences of the King and Queen's College of Physicians of Ireland and of the Royal College of Surgeons in Ireland, and in 1876 was elected a Fellow of the King and Queen's College of Physicians. From the beginning of his career he was a teacher. He held at once the posts of professor of anatomy and physiology in the Carmichael School of Medicine and lecturer in ophthalmology in Dr. Steevens' School. In 1870 he was appointed surgeon to the City of Dublin Hospital, a post which he soon exchanged for that of physician to the same institution. His career, however, took a definite line with his election in 1874 to the King's Professorship of the Institutes of Medicine in the School of Physic, Trinity College. He held this post, together with that of clinical physician to Sir Patrick Dun's Hospital, until 1901, when he decided to retire from active work. Nevertheless, in 1917, on the death of Dr. James Little, he consented to accept the chair of the Regius Professor of Medicine in Dublin University. In 1925 he retired from this last official connexion with Trinity College. His interest in the College did not cease, however, for shortly afterward he made it a gift of £10,000 to be employed for the advantage of the School of Physic and the other science schools of the College.

A bare recital of the offices held by Purser gives no conception of the part he played in the development of the modern school of medicine in Dublin. At the time of his appointment to the chair of the Institutes of Medicine the Dublin School was still under the dominance of the purely clinical ideas of Groves and Stokes. The influence of the latter, great as it had been and useful in its time, had now become a check on the introduction of ideas from any other

source than the bedside. There were, it is true, grumblings against the dead hand of observational medicine which prevented advance. Purser made his position clear immediately on his accession to the chair by indicating that he intended to interpret "the Institutes of Medicine" as physiology and histology. Prior to this there was no regular instruction in physiology in the Dublin school, the previous professors having lectured in medicine. To his instruction in physiology and histology Purser added a voluntary class in pathology, which he conducted, unpaid, for more than 20 years, until the teaching of pathology was put on a regular basis in the school by the appointment of Dr. A. C. O'Sullivan as lecturer. He retired from private practice but performed the duties of clinical physician at Sir Patrick Dun's Hospital. It is difficult to say whether he shone most as lecturer in physiology or as clinical teacher. His ideas were clear and distinct, and his exposition of them lucid. He did not overburden his lectures with experiments, though employing them when they served to illustrate his subject. He had an unusual gift of logical thought, which made it easy for any intelligent student to follow his lectures and to carry away a sound knowledge of the essentials of physiology. His clinical teaching was, in effect, physiology (and pathology) illustrated in the living subject. He had the gift of conveying to his class the reasoning by which he passed from the signs and symptoms to the underlying functional and anatomical changes. Medicine was to him, and to his disciples, a science, incomplete, it is true, but always approaching completion. In treatment he was a sceptic. He had little belief in drugs as therapeutic agents. He was known to have said a good word for opium, and to have admitted that quinine had its uses, but for most drugs he cared nothing. The kind of reasoning on which pharmacology was built at that time excited his scorn. Of a book by Lauder Brunton he wrote a devastating review. No man distinguished more clearly between hypothesis and established fact. One consequence therefrom is that little if any of his positive teaching of 40 years ago is to-day unsound; it has been supplemented by the advance of knowledge, but rarely has it been falsified. This attitude toward medicine is a far step from that of the great Dublin clinicians, and Purser is rightly regarded as the leader in, and father of, modern medicine in Dublin. It was fortunate for Irish medicine that such a man was found at the moment when the new step was necessary. It is true that he wrote little. For this there were two reasons. His teaching duties kept him busy, and he read enormously that he might be fitted to teach progressively. But, more important than this, was the critical attitude which prevented him publishing anything to which he could not assign a high positive value. He published an admirable "Manual of Histology" in the early 'eighties, but he never troubled to issue a second edition.

Personally Purser was reserved, retiring, and modest. He disliked every kind of publicity. For example, he declined nomination for the Presidency of the Royal College of Physicians of Ireland when it was offered to him, on the ground that he was a physiologist, not a physician. His students were afraid of his sharp tongue—for no one could rebuke pretence or presumption more effectively—but they respected his conscientious performance of duty and his great ability as a teacher and man of science. As they knew him better the fear diminished and the respect increased. Those who came to intimacy with him realised the generosity of temper, the clear simplicity, and the wide range of culture. His leisure—scanty as it was during his tenure of the professorship—was given to reading, to travel, to art. In 1901, when Purser resigned the King's Professorship, his old pupils established a medal in the school in commemoration of his tenure of office, and the John Mallet Purser medal is awarded each year to the best student in physiology. Dr. Purser was unmarried.

Medical News.

UNIVERSITY OF LONDON: *University College.*—Forthcoming public lectures include a Rickman Godlee Memorial Lecture, by Viscount Grey of Fallodon, at 5.30 P.M. on Thursday, Nov. 7th; one on Medicine in the Days of Shakespeare, by Dr. Herbert Spencer, at 2 P.M. on Monday, Nov. 25th; and four on Secretion of the Digestive Juices, by Dr. R. J. Brocklehurst, at 5 P.M. on Mondays, Oct. 14th, 21st, and 28th, and Nov. 4th.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—Demonstrations of specimens will be given in the theatre of the College at 5 P.M. on Fridays, Oct. 18th and 25th, and Nov. 1st, by Sir Arthur Keith, F.R.S.; and at the same hour on Mondays, Oct. 21st and 28th, and Nov. 4th, by Mr. C. P. G. Wakeley. They will be open to advanced students and to practitioners.

BRITISH INSTITUTE OF PHILOSOPHICAL STUDIES.—Courses of lectures have been arranged by the Institute from Oct. 10th onwards, and particulars may be had from the Director of Studies (Mr. Sydney Hooper), 88, Kingsway, London, W.C. 2. Forthcoming courses include six lectures on Mind and Nature, by Prof. L. J. Russell; six on the Interpretation of Development and Heredity, by Mr. E. S. Russell, D.Sc.; and a series entitled an Introduction to Philosophy, by the Director of Studies.

ST. MARY'S HOSPITAL POST-GRADUATE COURSE will be held as usual during the first week-end of the autumn session. The 12 lectures, which are open to all medical practitioners without fee, will be held in the library of the Medical School (except the lantern lectures, which will be held in the Physiology Theatre) on Oct. 4th, 5th, and 6th. Particulars will be found in our Medical Diary.

HOSPITAL DINNERS.—The annual dinner of *King's College Hospital* will be held at the Connaught Rooms, Great Queen-street, London, W.C., on Wednesday, Oct. 2nd, at 7 for 7.30 P.M., with Dr. H. Willoughby Lyle, Dean of the Medical School, in the chair. As we have already announced, the centenary session will be opened at the Medical School, Denmark Hill, at 2.30 P.M. on the same day.—The *Westminster Hospital* dinner will be held at Grosvenor House, Park-lane, W., on Tuesday, Oct. 1st, at 7 for 7.30 P.M., with Mr. Stanley Dodd in the chair.

LONDON HOSPITAL MEDICAL COLLEGE.—The Schorstein Memorial Lecture will be delivered by Dr. A. F. Hurst on Friday, Nov. 8th, at 4.30 P.M., in the Bearstead Clinical Theatre. Dr. Hurst has chosen as his subject Precursors of Carcinoma of the Stomach, and all members of the medical profession are invited to attend.

ROYAL DENTAL HOSPITAL SCHOOL OF DENTAL SURGERY.—A conversazione and prize distribution will be held at this school, in Leicester-square, London, W.C., on Wednesday, Oct. 2nd, at 8 P.M., when Dr. William Hunter will preside and give an address to the students.

ROYAL INSTITUTE OF PUBLIC HEALTH.—The Council have completed the purchase of a freehold island site on the north side of Queen-square, Holborn, London, W.C., where it is proposed that the new premises of the Institute shall be erected.

COURSES IN GENITO-URINARY DISEASES.—At St. Paul's Hospital, Endell-street, Shaftesbury-avenue, London, W.C., a series of lectures on genito-urinary diseases will be given at 4.30 P.M. on Wednesdays from Oct. 2nd to Nov. 27th. Practitioners or students wishing to attend these lectures or the practice of the hospital may get further information from the secretary.

UNIVERSITY OF BIRMINGHAM.—Sir Farquhar Buzzard will deliver an address to students, entitled Arrogance and Ignorance in Medicine, on the occasion of the annual distribution of prizes on Tuesday, Oct. 1st. The ceremony will take place at 4.30 P.M. in the medical theatre of the University, Edmund-street.

UNIVERSITY OF DURHAM, COLLEGE OF MEDICINE.—The Duke of Northumberland, Chancellor of the University, will address the students in the College of Medicine, Newcastle-upon-Tyne, on Oct. 11th, at 4.15 P.M., on Some Scientific Theories and their Foundations at the opening of the winter session. A dinner will be held the same evening at the Central Station Hotel, Newcastle-upon-Tyne, at 7.15 for 7.30 P.M., when the Chancellor will be officially welcomed by the governors, Council, and staff of the College, and the University of Durham Medical Graduates' Association.

SURGICAL INSTRUMENT MANUFACTURERS ASSOCIATION.—The annual dinner of this Association will take place at the Holborn Restaurant on Friday, Oct. 11th, at 6.30 for 7 P.M.

FOOT HOSPITAL FOR MANCHESTER.—A new foot hospital was opened on Sept. 21st by the Dean of Manchester. The hospital is in Upper Brook-street, and has been established by the Incorporated Society of Chiropodists. It will be open in the evenings to suit working people, and will be carried on entirely by voluntary workers.

POST-GRADUATE COURSE AT THE LONDON HOSPITAL.—It has been suggested that a post-graduate course for old students of the London Hospital should be held during the week of the annual dinner, which is arranged for Thursday, Oct. 17th, at the May Fair Hotel. Such a course will be held if there is enough demand, and the probable dates are Oct. 16th, 18th, and 19th.

QUEEN ALEXANDRA HOSPITAL, COSHAM.—The Committee appointed by the Minister of Pensions to inquire into the administration of this hospital is willing to consider relevant statements by patients, ex-patients, and others. They should be addressed to the Secretary of the Committee, Mr. R. Herbert, at 18, Great Smith-street, London, S.W. 1.

MANCHESTER WELFARE CENTRES.—The Manchester Corporation Public Health Committee have asked the city council for authority to assume control of three child welfare centres at Withington, Chorlton-cum-Hardy, and Didsbury—the only welfare centres in the city which still remain under the control of the School for Mothers.

DUDLEY MATERNITY HOME.—Last week the Countess of Harrowby opened a new maternity home and a nurses' home erected at a cost of over £30,000 by the Dudley Board of Guardians. The maternity home is a one-storey building intended to form an integral part of the large hospital which it is hoped to erect on the site. There are 11 beds in three wards, and a single-bed separation ward. The nurses' home provides housing for 62 nurses and probationers.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY, Sept. 30th, to SATURDAY, Oct. 5th.—BETHLEM ROYAL HOSPITAL, S.E. Tues. and Sat., 11 A.M., lecture demonstrations in Psychological Medicine.—PRINCE OF WALES'S GENERAL HOSPITAL, Tottenham, N. Special Course in Gastro-enterology. One week only. Further particulars from the Fellowship of Medicine.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.

MONDAY, Sept. 30th.—2.30 to 5 P.M.: Medical, Surgical and Gynæcological Clinics. Operations.
TUESDAY, Oct. 1st.—2.30 to 5 P.M.: Medical, Surgical, Ear, Nose and Throat Clinics. Operations.
WEDNESDAY.—2.30 to 5 P.M.: Medical, Skin, and Eye Clinics. Operations.
THURSDAY.—11.30 A.M.: Dental Clinics. 2.30 to 5 P.M.: Medical, Surgical, Nose, Throat and Ear Clinics. Operations.
FRIDAY.—10.30 A.M.: Throat, Nose and Ear Clinics. 2.30 to 5 P.M.: Surgical, Medical, and Children's Diseases Clinics. Operations.

ST. MARY'S HOSPITAL POST-GRADUATE COURSE.

FRIDAY, Oct. 4th.—11–11.45 A.M., Prof. F. S. Langmead: Graves's Disease. 12–12.45 P.M., Dr. T. C. Hunt: Recent Aids in Diagnosis of Some Common Diseases. 2.15–3 P.M., Mr. Aleck W. Bourne: The Action of Certain Drugs on the Uterus in Labour (Lantern Lecture). 3.15–4 P.M., Dr. A. Hope Gosse: Lantern Demonstration concerning Diseases of the Chest.
SATURDAY.—10.15–11 A.M., Mr. Duncan C. L. Fitzwilliams: Treatment of Malignant Disease by Radium. (With Epidiascope.) 11–11.45 A.M., Sir William Willcox: Catarrhal Jaundice. 12–12.45 P.M., Dr. Robt. Hutchison: Common Dyspepsias of Childhood. 2.15–3 P.M., Mr. T. G. Stevens: Retention of Urine in Women. 3.15–4.15 P.M., Dr. Albert Eidinow: Clinical Methods in Light Treatment.
SUNDAY.—10.15–11 A.M., Mr. R. M. Handfield-Jones: Pitfalls in Urological Diagnosis. 11–11.45 A.M., Dr. C. M. Wilson: Diabetes. 12–12.45 P.M., Mr. V. Zachary Cope: Abdominal Pain.

LONDON SCHOOL OF DERMATOLOGY, St. John's Hospital, 49, Leicester-square, W.C.

THURSDAY, Oct. 3rd.—5 P.M.: Dr. J. H. Stowers: Introductory Lecture.

CENTRAL LONDON THROAT, NOSE AND EAR HOSPITAL, Gray's Inn-road, W.C.

MONDAY, Sept. 30th.—1.30 P.M.: Hearing Tests.
WEDNESDAY, Oct. 2nd.—1.30 P.M.: Examination and Diagnosis: The Sinuses.

ST. PAUL'S HOSPITAL, Endell-street, W.C.

WEDNESDAY, Oct. 2nd.—4.30 P.M., Mr. H. P. Winsbury White: Stone in the Upper Urinary Tract.

MANCHESTER ROYAL INFIRMARY POST-GRADUATE COURSE.

TUESDAY, Oct. 1st.—4.15 P.M., Mr. F. G. Wrigley: Acute Suppurative Otitis Media.
FRIDAY.—4.15 P.M., Dr. R. Prosser White: Some Problems in Occupational Dermatitis.

Appointments.

REDMOND, W. A., M.B., Ch.B. Dub., has been appointed Medical Officer, Ballyward Dispensary District, Co. Down.
SIMS, CARRIE, M.B., Ch.B. Birm., D.P.H., Medical Officer on the Staff of the Ministry of Health.
SPICKET, J. S., L.R.C.P. Lond., M.R.C.S., District Medical Officer, Haverfordwest Union.
THOMAS, D. M., L.R.C.P. Lond., M.R.C.S., Public Vaccinator for Greenwich District.
WILSON, H. F., Certifying Surgeon under the Factory and Workshop Acts for the Carnoustie District of the County of Angus.
Queen Charlotte's Maternity Hospital: DOLEMAN, F. T., L.R.C.P. Lond., M.R.C.S., Senior Resident Medical Officer; HUGHES, T. I., L.R.C.P. Lond., M.R.C.S., Assistant Resident Medical Officer; KINGSMILL, C. M., M.B., B.S. Lond., District Resident Medical Officer; and LEBEN, C., L.R.C.P. Lond., M.R.C.S., Resident Anæsthetist.

Vacancies.

For further information refer to the advertisement columns.

Aberdeen Royal Mental Hospital.—Jun. Asst. P. £250.
Aberystwyth Infirmary and Cardiganshire General Hospital.—H.S. £200.
Albert Dock Hospital, Connaught-road E.—Surgeon.
Bath, Somerset and Wilts Central Children's Orthopædic Hospital, Coombe Park.—H.S. At rate of £120.
Belgrave Hospital for Children, 1, Clapham-road, S.W.—H.S. Also Asst. H.P. Each at rate of £100.
Birkenhead General Hospital.—Cas. S. £100.
Birmingham, Dudley Road Hospital.—Jun. Asst. M.O. At rate £200.
Birmingham, Selly Oak Hospital.—Res. Physician. £400–£600.
Birmingham City Education Committee.—Asst. School M.O. £600.
Blackburn and East Lancashire Royal Infirmary.—Fourth H.S. £130.
Bootle Borough Hospital, Derby-road.—Hon. Asst. Gynæcological Surgeon.
Brighton, Royal Sussex County Hospital.—H.P. £150.
Bristol Dispensary.—Non-Resident M.O.
Cambridge, Addenbrooke's Hospital.—Hon. Asst. P.
Cambridge, Papworth Village Settlement.—Second Asst. M.O. £300. Also H.P. At rate of £100–£200.
Cardiff, Glan Ely Tuberculosis Hospital, Fairwater.—Asst. Res. M.O. £250.
Carmarthen Joint Counties Mental Hospital.—Jun. Asst. M.O. £300.
Central London Throat, Nose and Ear Hospital, Gray's Inn-road, W.C.—Hon. Chief Clin. Assts.
City of London Hospital for Diseases of the Heart and Lungs, Victoria Park, E.—H.P. At rate of £100.
Eastern Dispensary, Leman-street, E.—Physician.
Exeter, Royal Devon and Exeter Hospital.—Hon. Physician.
Gloucester, Gloucestershire Royal Infirmary, &c.—Hon. S. to Ear, Nose and Throat Dept. Also First H.S. At rate of £135.
Great Yarmouth General Hospital.—Sen. H.S. £150. Also Jun. H.S. £100.
Grosvenor Hospital for Women, Vincent-square, S.W.—Res. M.O. At rate of £100.
Highgate Hospital, Dartmouth Park Hill, N.—Third Asst. M.O. £350.
Hospital for Consumption and Diseases of the Chest, Brompton, S.W.—H.P. At rate of £50.
Hospital for Epilepsy and Paralysis, Maida Vale, W.—Res. M.O. Also H.P. At rate of £150 and £100 respectively.
Hospital of St. John and St. Elizabeth, Grove End-road, N.W.—Res. H.S. At rate of £75.
Hull Royal Infirmary.—Asst. H.P. At rate of £130.
Isleworth, West Middlesex Hospital.—Res. Asst. Med. Supt. and Asst. M.O. £450.
Kingston and District Hospital.—Third Asst. Res. M.O. At rate of £250.
Larbert, Stirling District Mental Hospital.—Third Asst. M.O. £250.
Leeds Public Dispensary.—Jun. Res. M.O. £150.
Liverpool Hahnemann Hospital, Hope-street.—Stipendary M.O. At rate of £125.

Liphook, Hants, King George's Sanatorium for Sailors.—Asst. M.O. At rate of £200.
London Homœopathic Hospital, Great Ormond-street, W.C.—Surgeon in charge of the Mechanotherapy and Orthopædic Dept.
London Jewish Hospital, Stepney Green, E.—Hon. Asst. Radiologist. Also Hon. M.O. in charge of Actino-Therapeutic Dept.
London Temperance Hospital, Hampstead-road, N.W.—Res. M.O. At rate of £175.
Manchester Ear Hospital, Grosvenor-square, All Saints.—H.S. At rate of £150.
Newcastle-upon-Tyne Eye Hospital.—H.S. £200.
Nottingham City Mental Hospital.—Jun. Asst. M.O. £350 to £400.
Paddington Green Children's Hospital, W.—H.P. and H.S. Each at rate of £150. Also Anæsthetist, £75.
Prince of Wales's General Hospital, Tottenham, N.—Sen. H.P. Sen. H.S., and Special H.S. Each at rate of £120. Also Jun. H.P., and Two Jun. H.S.'s. Each at rate of £90.
Princess Louise Kensington Hospital for Children, North Kensington.—H.P. At rate of £75.
Rotherham Hospital.—H.P. £180.
Royal Free Hospital, Gray's Inn-road, W.C.—Sen. Res. M.O. £150. Also Cas. O. £150.
Royal National Orthopædic Hospital, 234, Great Portland-street, W.—Hon. Asst. Surg. Also Surg. Registrars. Each £105.
Royal Naval Medical Service.—Vacancies for Medical Officers. £452–£2350.
Saint Mark's Hospital for Cancer, &c., City-road, E.C.—H.S. At rate of £75.
Sheffield, South Yorkshire Mental Hospital.—M.O. £400.
St. Peter's Hospital for Stone, Henrietta-street, W.C.—Radiologist. £25.
St. Stephen's Hospital, 369, Fulham-road, S.W.—Third Asst. M.O. £300.
Southampton Free Eye Hospital.—H.S. £150.
Stafford, County Mental Hospital.—Second Asst. M.O. £600.
Sudan Medical Service.—M.O. £E720.
Swansea Hospital.—H.S. £150.
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The Chief Inspector of Factories announces vacant appointments for Certifying Factory Surgeons at Ludlow (Salop), and Topsham (Devon).

The Secretary of State for the Home Department gives notice of a vacancy for a Medical Referee under the Workmen's Compensation Act for the Districts of the Bath, Calne, Chippenham, Devizes, Frome, Hungerford, Malmesbury, Marlborough, Melksham, Newbury, Swindon, Trowbridge and Warminster County Courts (Circuit No. 52). Applications should reach the Private Secretary, Home Office, Whitehall, London, S.W., not later than Oct. 14th.

Births, Marriages, and Deaths.

BIRTHS.

CHAPMAN.—On Sept. 20th, at Marine House, Bridlington, Yorks, the wife of P. D. H. Chapman, M.B., B.Ch., of a daughter.
FITZSIMONS.—On Sept. 19th, at Albany-road, Cardiff, the wife of Dr. R. A. Fitzsimons, of a daughter.
FRAZER.—On Sept. 22nd, at Mowbray-road, Brondesbury, N.W., to Dr. Kathleen Frazer, the wife of R. B. F. Frazer, L.R.C.P., Barrister-at-Law—a daughter.
MUIR.—On Sept. 22nd, at Sussex House, Sutherland-avenue, W., the wife of J. B. G. Muir, M.B., B.S., F.R.C.S., of a son.

MARRIAGES.

JOHNSTON—ROOKE.—On Sept. 19th, at the Presbyterian Church, Camp Hill, Birmingham, William Macdonald Johnston, M.B., Ch.B., Crouch Hill, N., to Nancy Rooke, of Egbaston, Warwickshire.
MITCHELL—MCCONNELL.—On Sept. 4th, John Myles Mitchell M.B., B.Ch., B.A.O., to Adelaide Patricia, youngest daughter of T. E. McConnell, C.B.E., and Mrs. McConnell, of Belfast.

DEATHS.

ALLAN.—Thomas Sprot Allan, L.R.C.P., L.R.C.S. Edin., L.F.P.S. Glasg., Lieut.-Colonel R.A.M.C. (T.F.) (retired) late Surgeon R.M.S. *Appam*, Elder Dempster and Co., Ltd. Age 65, at the "Robert Davies" Nursing Home, Liverpool, on Sept. 16th after an operation. Interred at Allerton Cemetery, Liverpool, on the 19th inst.
BOWHAY.—On Sept. 17th, at Yelverton, Devon, Albert Bowhay, M.D., late of Gunnislake, Cornwall, aged 67.
COOPE.—On Sept. 24th, of acute poliomyelitis, Jean Rosemary, aged 5½ years, daughter of Dr. and Mrs. Robert Coope, of 13, Rodney-street, Liverpool.
MANBY.—On Sept. 20th, at Palace Gardens-terrace, W., Edward Petronell Manby, M.D., Med. Off., Min. of Health.
WILLIAMS.—On Sept. 17th, at Richmond, Yorkshire, Howell Williams, M.D., aged 84.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

"THE WEEKLY WEATHER REPORT."

FROM 1878 until February of last year a report on weather conditions was issued week by week by the Meteorological Committee. The place of these has now been taken by an annual volume which retains the original title. The first of these, now before us,[1] refers to the figures for the year 1928/29. The main feature of the report is a collection of statistics on the temperature, rainfall, and sunshine for a number of districts of the British Isles, from which long period normals for the different periods and districts have been calculated for each week of the year. The table of normals for mean temperature, number of rain days, rainfall, and daily duration of sunshine for each of the 12 districts of the British Isles and for each of the 52 weeks of the year is in fact based on observations for the 35 years 1881/1915. For each district the deviation from the normal during the year is shown in respect of temperature, rainfall, and bright sunshine. Observations at Kew Observatory for the 20-year period 1907/26, compared with the 35-year period 1881–1915, indicate that the summers in southern England have become cooler and the winters warmer in recent years. The records of bright sunshine, that is to say, sunshine sufficiently intense to make a charred trace on the card of a Campbell-Stokes recorder with a 4-inch spherical lens, indicate that smoke pollution may make itself felt at a considerable distance from its source. The sunshine expressed as a percentage of the possible duration for the year was in York only 28, while in Southport it was 33; for the winter the figures were 12 and 18 respectively. And this difference might be anticipated owing to the prevalence of westerly and south-westerly winds which carry the smoke of the industrial area away from Southport and towards York. This is only one example of the use to which the wealth of accurate information contained in this report can be put.

IRONSTONE AND LIGHTNING.

AT an inquest at Worth on Sept. 19th, on two people who had been killed by lightning on the previous afternoon, the theory was advanced that the lightning was attracted by an under-crop of ironstone rock which is to be found in a large area of North Sussex. Four men were working in a field picking potatoes when the storm broke, and they ran to an oak tree for shelter. The tree was not struck but two of the men, one aged 25, and the other 42, were killed; also two dogs. One of the other men said his legs felt numb for some time, and the shock was as though his knees had been hit by a sledge-hammer. The fourth, a boy, was not much affected. Dr. A. Grayling stated that the cause of death was shock from lightning. Evidence of the lightning having struck the men was to be seen by the curious arborescent marks upon their bodies. Dr. Grayling added that in some parts of Sussex there were quantities of under-crops of ironstone rock, and that would attract electrical discharge. It was possible that in some parts of the particular field there was such an under-crop. Dr. E. F. Hoare, the East Sussex coroner, returned a verdict of death from misadventure.

A CAUTIONARY NOTICE.

MEMBERS of the medical profession often receive begging letters from persons claiming to be either widows or daughters of doctors. When such letters are forwarded to the secretary of the Royal Medical Benevolent Fund for inquiry it may be found that the person is known in the office of the Fund as one not deserving of charity. In the interests of medical charity the secretary of the Fund asks that letters from persons unknown asking for assistance should be forwarded to him at 11, Chandos-street, London, W. 1, for inquiry and report.

[1] H.M. Stationery Office. 15*s*.

ASTHMA RESEARCH COUNCIL.—The Council's new address is 37, Russell-square, London, W.C. 1, and the telephone number Museum 3313.

NEW CASUALTY DEPARTMENT AT NOTTINGHAM.—The great increase in the number of accidents has made it necessary to enlarge the casualty department of Nottingham General Hospital. There are now separate entrances for walking and stretcher cases, an anæsthetic room, surgeries for men and women, an operating theatre, and two recovery rooms.

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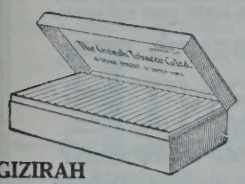

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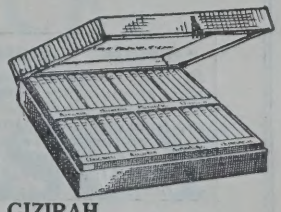

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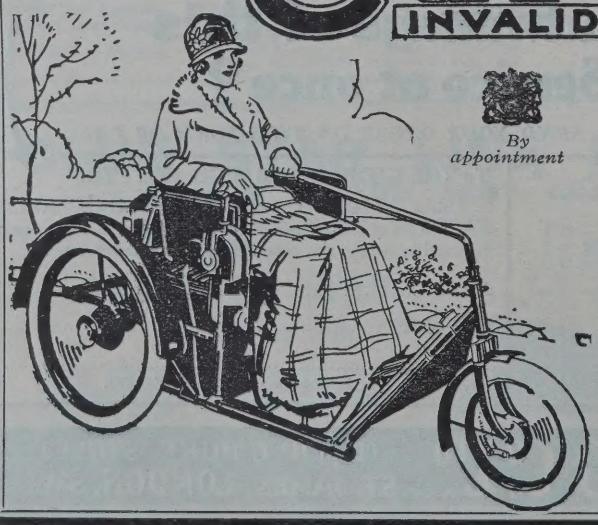

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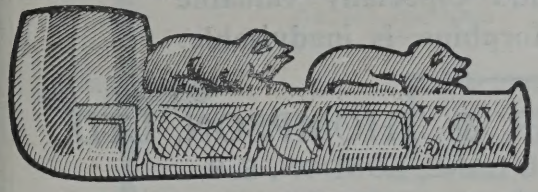

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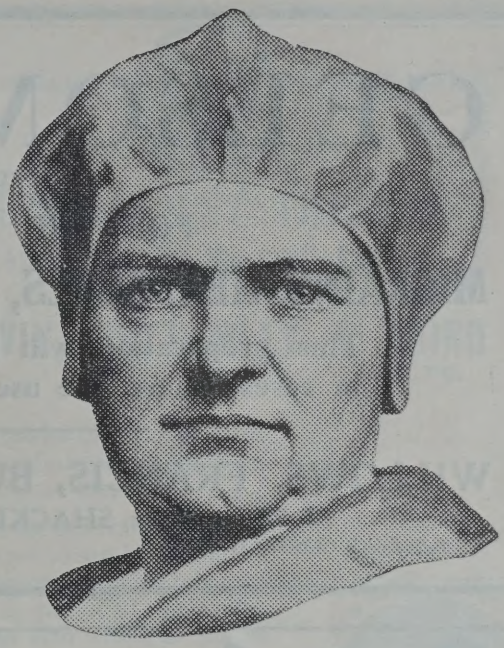

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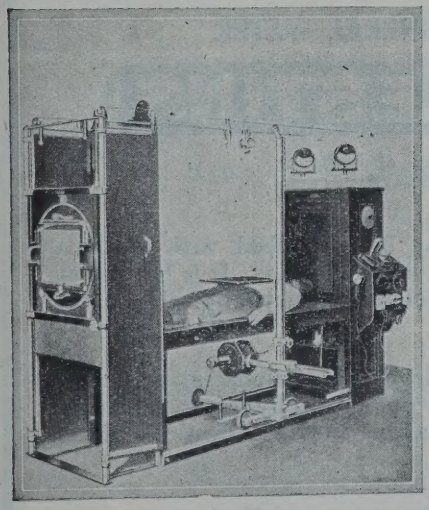

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¶ The VICHY WATERS, being almost devoid of Sulphates, are most agreeable to the taste, and are daily relied upon by Physicians the world over in the treatment of Gout and Rheumatism and for Affections of the Liver, Stomach, etc.

NATURAL VICHY SALTS for Drinking and Baths.
VICHY DIGESTIVE PASTILLES prepared with Natural Vichy Salts.

CAUTION.—Each bottle from the STATE SPRINGS bears a neck label with the word "VICHY-ÉTAT" and the name of the SOLE AGENTS:—

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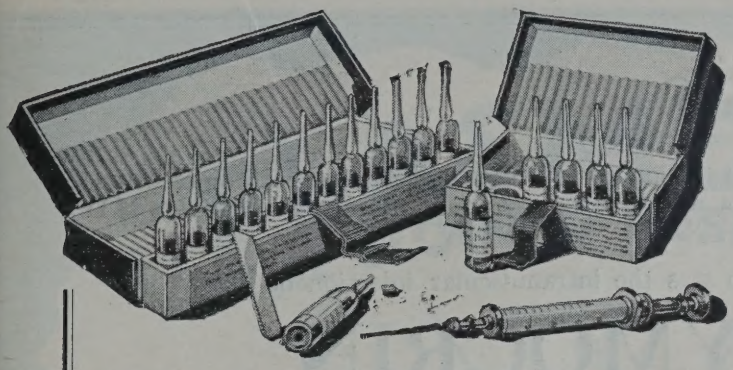
And at LIVERPOOL and BRISTOL.
Samples free to Members of the Medical Profession.



Pituitary
(Posterior Lobe)
Extract
B.D.H.

With the advance of endocrine treatment and with the consequent wider use in medicine of organo-therapeutic products it has become a matter of particular urgency for the physician to employ only those products which he knows to be thoroughly reliable; it is not feasible in actual practice for the physician himself to test the relative potencies of different preparations—he must confine the material in his armamentarium to that issued by manufacturers whose products are known to be of an unassailably high standard. Pituitary ⟨Posterior Lobe⟩ Extract B.D.H. comes within this category, and physicians employing it can do so with full confidence. It is doubly standardised, for the pressor action and for the effect in contracting uterine muscle, and it is of entirely British manufacture.

Issued also in boxes containing 100 ampoules specially for hospital use.

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Some immediate protection afforded.
Highest Antigenic Value.
Cause less local and systemic reaction because method of preparation reduces toxicity.
Larger doses may be given and at shorter intervals.

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(Sensitized Bacterial Vaccine)

This product differs from ordinary vaccines because it is "sensitized," that is, the bacteria have previously been treated with homologous immune serum, from which have been absorbed quantities of their respective antibodies. No serum is present in the preparation, however, the bacteria having been washed completely free of it. A degree of immediate passive resistance is conferred by injection of the serobacterin, by reason of the setting free of some of the antibodies. This degree of resistance persists until active immunity has been established. The formula includes :— B. Influenzæ, Staphylococcus (aureus and albus), Streptococcus, B. Friedlander, Pneumococcus, Types I, II, and III, M. Catarrhalis.

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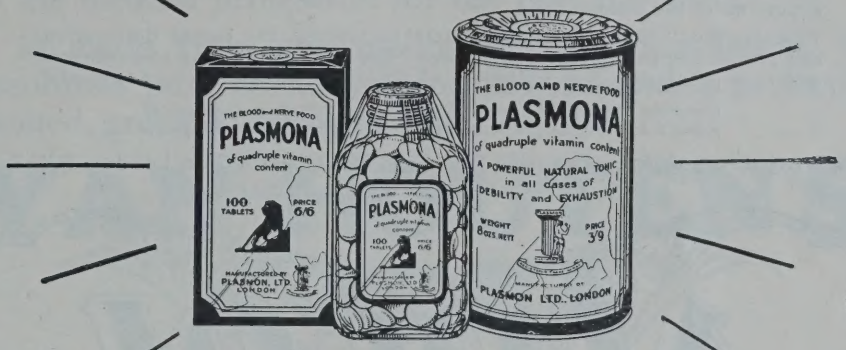

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Blood forming hormones	20%
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Magnesium Salts (Mg O)	10%
Ferro Salts ($Fe_2 O_3$)	1.5%
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Iodine	0.025%
Carbonic Acid (CO_2)	8%

2 or 3 Plasmona Tablets are equal in therapeutic value to 1 to 2 heaped teaspoonfuls of the powder.

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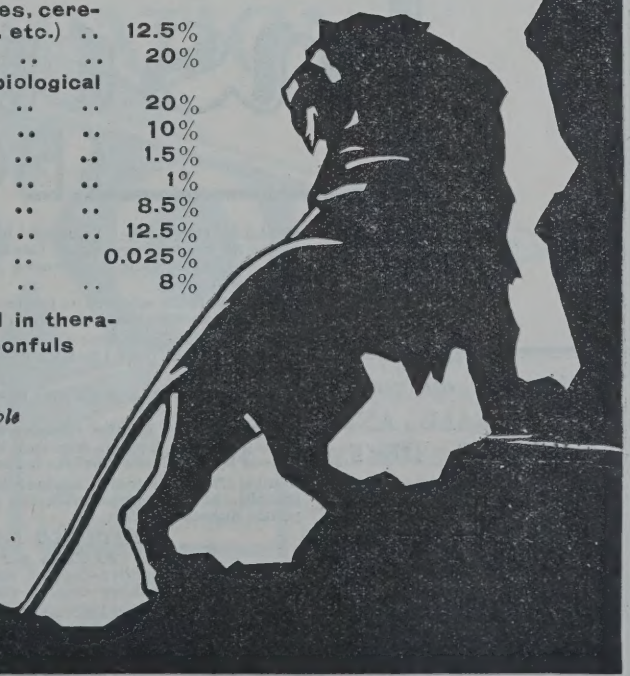

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It is made from the mellowest of Cocoa-beans, is absolutely pure without added flavour, and is perfectly roasted, ground and balanced.

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Original and Best

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PHYSIOLOGICAL TREATMENT OF CONSTIPATION

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COMPOSED OF

1st — TOTAL EXTRACT of the GLANDS of the INTESTINE Which increases the secretions

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3rd — AGAR AGAR Which re-hydrates the intestinal contents

4th — SELECTED LACTIC FERMENTS Anti-microbic and Anti-toxic action

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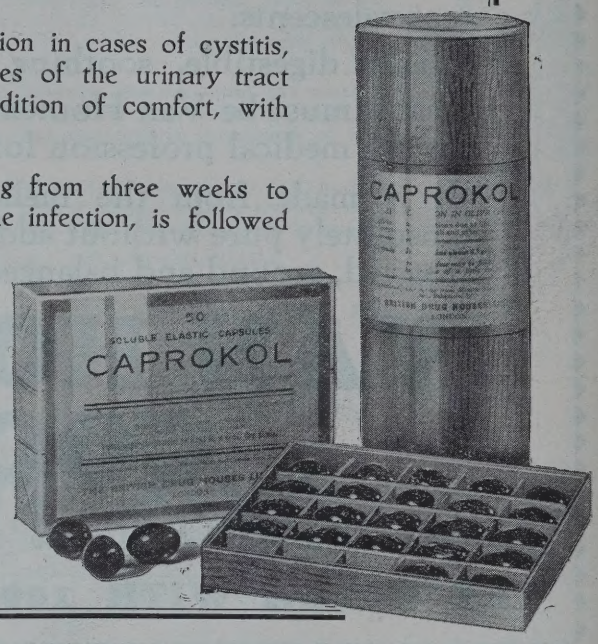

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Toxæmias of Pregnancy

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The toxæmias of pregnancy have been investigated and illuminated extensively in the past ten years by the patient research of many brilliant observers, who are all emphatic in representing the importance of intestinal toxæmia in the puerperal picture. Their conclusions point to the necessity of providing

A Safe Intestinal Bactericide

to promote the well-being of mother and child by limitation of putrefactive changes in the bowel during the later months of gestation, and until the post-puerperal period is passed.

Such a product is now available in the form of Dimol, the effect of which can be readily estimated by the gradual disappearance from the urine of the toxins-tyramine, indican, skatol, etc.

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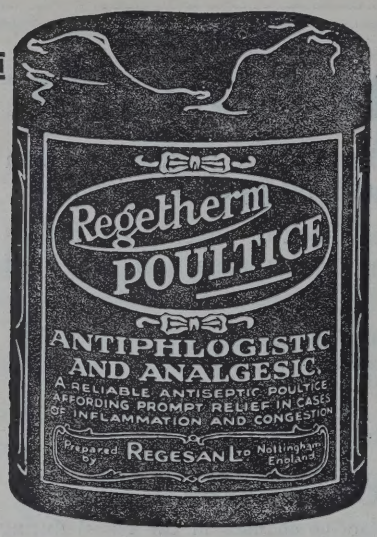

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More certain in its action than the old-fashioned poultice.

The healing action of Regetherm Antiphlogistic Poultice is governed by its ability to prolong and maintain an even degree of heat over a lengthy period. Moreover, the ingredients are so balanced that this action does not set up any counter-irritation, but allays pain, ensures an even circulation through the congested areas, and thus induces natural and pain-free rest.

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Compound Syrup of Hypophosphites

TRADE **"FELLOWS"** MARK

accelerates Convalescence, restores Energy and Vitality; and for over fifty years has been known as

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'A.B." Insulin connotes:

Uniformity of unitage.
Full potency and stability in all climates.
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Absence of reaction-producing proteins with consequent noteworthy freedom from unpleasant by-effects.

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The difficulties that attend hand-rearing are minimised by the use of cow's milk modified by

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The physical texture of the casein is thereby modified, the carbohydrate constituent raised, and the saline ingredients adjusted, so that the resulting mixture gives most satisfactory results under all average conditions.

Samples and directions for feeding, as well as suggestions for the modification of milk by means of Mellin's Food in cases of malnutrition, diarrhœa, or constipation, will be gladly forwarded by:

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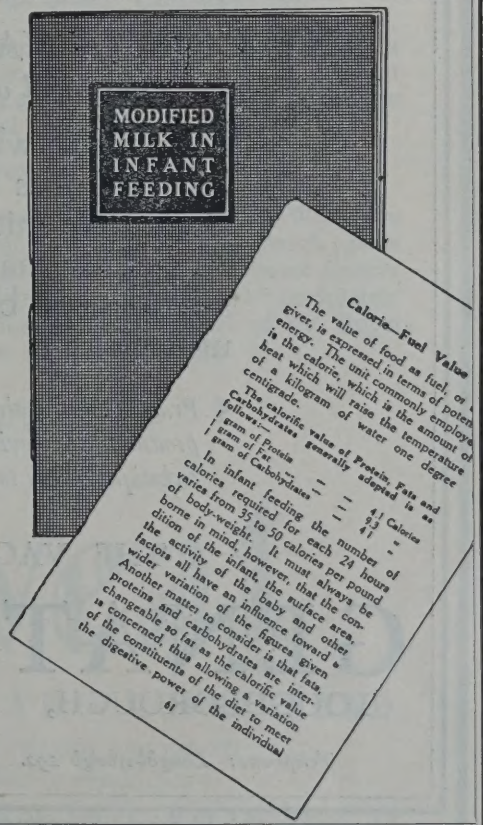
MODIFIED MILK IN INFANT FEEDING
Calorie—Fuel Value
The value of food as fuel, or
giver, is expressed in terms of poten
energy. The unit commonly employe
is the calorie, which is the amount of
heat which will raise the temperature
of a kilogram of water one degree
centigrade.
The calorific value of Protein, Fats and
Carbohydrates generally adopted is as
follows:—
1 gram of Protein = 4.1 Calories
1 gram of Fat = 9.3 „
1 gram of Carbohydrates = 4.1 „
In infant feeding the number of
calories required for each 24 hours
varies from 35 to 50 calories per pound
of body-weight. It must always be
borne in mind, however, that the con-
dition of the infant, the surface area,
the activity of the baby and other
factors all have an influence toward a
wider variation of the figures given
Another matter to consider is that fats,
proteins and carbohydrates are inter-
changeable so far as the calorific value
is concerned thus allowing a variation
of the constituents of the diet to meet
the digestive power of the individual
61

ALTERNATIVE METHODS IN

PROPHYLAXIS & TREATMENT

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DETOXICATED ANTI-CORYZA VACCINE

This Vaccine has been used with great success for several years. Its outstanding feature is the absence of reaction, which makes it especially useful for hypersensitive patients.

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Many practitioners consider a slight reaction has definite therapeutic value, and this type of Vaccine has been prepared to meet their requirements. It has the advantage of a very low price.

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For patients who object to Vaccine treatment by subcutaneous injections, and for children, this Local Immunity Product is particularly indicated. An additional convenience is that frequent attendances by the patient for injections are unnecessary.

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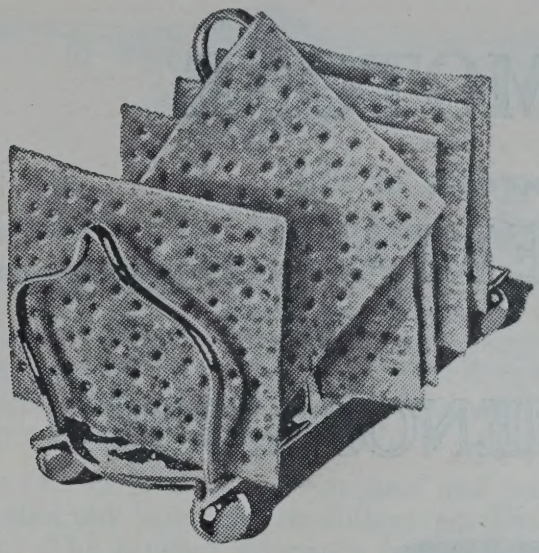

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Vita-Weat is extremely palatable, possessing a delicious "crunchiness" and ripe-corn flavour. Its crispness encourages mastication and so promotes a healthy condition of the teeth and gums.

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"The calorie value of Vita-Weat," says the *Practitioner*, "is 2,132 per lb., which may be compared with the calorie value of fresh white bread, namely 1,210 per lb." It will thus be seen that Vita-Weat possesses a high physiological fuel value.

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The branny scales of Vita-Weat act as a stimulant to normal peristalsis, whilst not exerting an undue irritative effect on the intestinal mucous membrane.

To Prevent Obesity.

The starch granules in Vita-Weat are thoroughly disintegrated. No starch passes unconverted into the body to cause obesity and indigestion. Vita-Weat is "completely assimilable," states a report of the Royal Institute of Public Health.

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THE *BRITISH* WHOLE-WHEAT CRISPBREAD

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HORMOTONE

BRAND

in disorders of the

CATAMENIA

and the

MENOPAUSE

Hormotone supplies the physiological stimulus to the endocrine glands whose functional activity determines the normal catamenial flow.

When these internal secretions begin to fail at the period of the menopause, Hormotone acts both by substitution and homostimulation.

Dose: 1 or 2 tablets three times daily.

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The Product of Unique Experience

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Adrenalin (P., D. & Co.)—the original and well-tried preparation—is extracted from the medullary portion of selected adrenal glands. The isolated substance is then standardised by both physiological and chemical methods to secure full activity of the finished preparations.

Medical men can make sure of obtaining an Adrenalin that is potent, uniform in action, and reliable by specifying "P., D. & Co.".

Full particulars of Adrenalin (P., D. & Co.) and its uses in medicine will be supplied on request. Adrenalin Chloride Solution, P., D. & Co., is supplied in bottles and ampoules. Hypodermic Tablets, Inhalant, Lozenges, Suppositories, Ointments, etc., and Adrephine (Adrenalin-Ephedrine Compound) are also available.

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Shock and Collapse
Anaphylactic Reactions
Febrile Conditions
Cardiovascular Disorders
Asthma
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Respiratory Disorders
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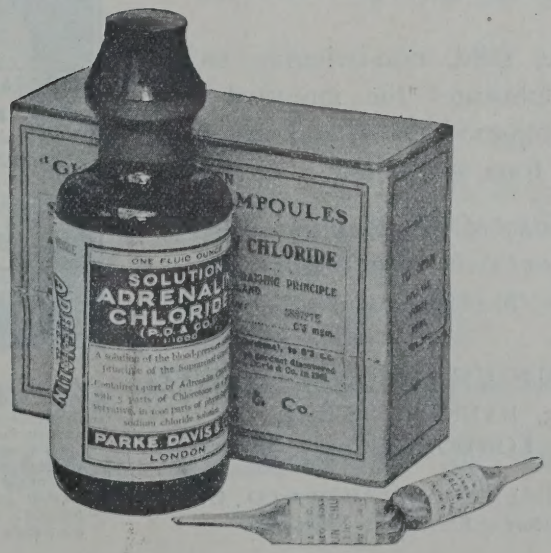

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Ocular Inflammations
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Neuralgic Pain
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Dentistry
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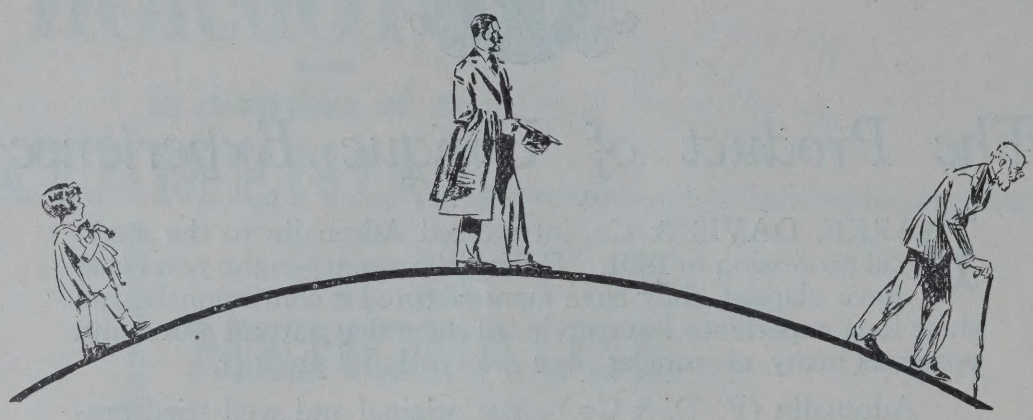

Throughout the span

of allotted years — from infancy with restricted diet, through manhood with irregularity of habits, to old age with failing muscular strength and intestinal atony, constipation besets "all types and conditions of men."

The remedy lies not in the doubtful results of harsh cathartics, but in helping the colon back to normal activity.

AGAROL BRAND COMPOUND

The original agar-agar emulsion

is dependable, mild, non-irritating to the organs. It lubricates the intestinal tract, softens the impacted fæces, and reactivates the peristaltic force and action.

A liberal quantity of Agarol Brand Compound for trial sent without cost or obligation to physicians.

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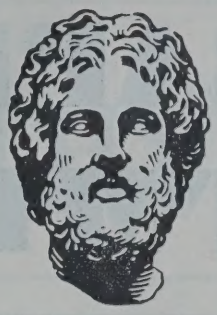
Prepared by WILLIAM R. WARNER & CO., INC.
Manufacturing Pharmacists Since 1856

Agarol Brand Compound is the *original* Mineral Oil—Agar-Agar Emulsion (with Phenolphthalein) and has these advantages:
Perfect emulsification; stability; pleasant taste without artificial flavouring; free from sugar, alkalies and alcohol; no oil leakage; no griping or pain; no nausea; not habit forming.



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EVANS'
Common Cold
VACCINE No. 3

Prophylactic.

Micrococcus catarrhalis	200 mills.
Diplococcus pneumoniæ	200 ,,
Streptococci	200 ,,
Bac. Friedlander	100 ,,
Bac. Septus	100 ,,
Staphylococci (alb. & aur.)	200 ,,
Micrococcus tetragenus	100 ,,
Bacillus influenzæ	100 ,,

1200 mills. per c.c.

Strongly recommended as a prophylactic and also in the treatment of inflammatory conditions of the upper air passages.

Supplied in 1 c.c. Ampoules, rubber capped bottles, and boxes of graduated doses.

Brochure on "Vaccine Therapy" may be had on application.

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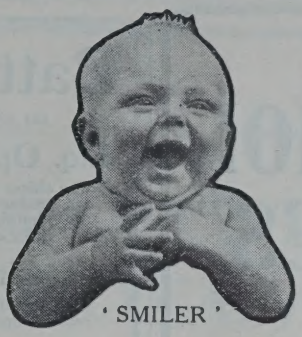

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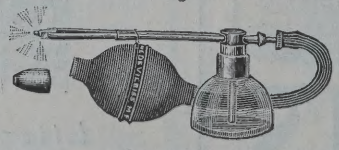

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The Past and Present Students' Dinner will be held the same evening at 7 for 7.30 at the Connaught Rooms, Great Queen-street, Kingsway, W.C.2. (The Secretaries to the Dinner Committee are Dr. Ernest Playfair and Dr. G. de Bec Turtle).

The Calender of the School, including that of the School of Dental Surgery, giving information as to Prizes, Entrance and other Scholarships, &c., may be obtained on application to the Dean, H. WILLOUGHBY LYLE, M.D. Lond., F.R.C.S., J.P., or to S. C. RANNER, M.A. Camb., The Secretary of the Medical School.

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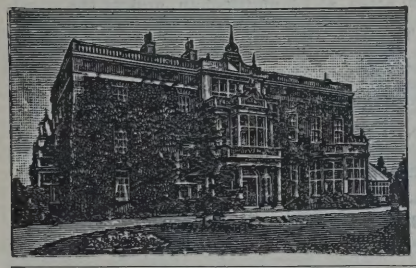

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Specially built and licensed for the care and treatment of a limited number of Ladies and Gentlemen suffering from NERVOUS or MENTAL breakdown. Voluntary boarders received. Psycho-Therapy in suitable cases if desired. Terms moderate. *Apply* RESIDENT PHYSICIAN. *Tel. No. 8 Formby.*

HAYDOCK LODGE,
NEWTON-LE-WILLOWS, LANCASHIRE.

For the reception and treatment of PRIVATE PATIENTS of both sexes of the UPPER AND MIDDLE CLASSES either voluntarily or under Certificate. Patients are classified in separate buildings according to their mental condition.

Situated in park and grounds of 400 acres. Self-supported by its own farm and gardens in which patients are encouraged to occupy themselves. Every facility for indoor and outdoor recreation. For terms, prospectus, etc., apply MEDICAL SUPERINTENDENT. *Phone:* 11 Ashton-in-Makerfield.

BETHLEM ROYAL HOSPITAL, LAMBETH ROAD, S.E.1

(For the Reception and Treatment of cases of Nervous and Mental Disease). *Telephone: Reliance 2182.*

President: COL. and ALDERMAN SIR CHARLES CHEERS WAKEFIELD, Bart., C.B.E
Treasurer: SIR LIONEL L. FAUDEL-PHILLIPS, Bart.
Physician Superintendent: J. G. PORTER PHILLIPS, M.D., F.R.C.P. Assisted by Physicians, a Pathologist, and a Staff of Visiting Consultants.

Patients of the **educated classes, in a presumably curable condition,** are eligible for admission. With a view to the early treatment of eligible cases **Voluntary or Uncertified** Patients are admitted. **Patients who can contribute 3 guineas weekly towards the cost of maintenance may be received as vacancies arise.** Treatment is carried out on the most modern principles. In connection with this Hospital there is a Convalescent Home on the Surrey hills at Witley.

For further particulars apply to the Physician Superintendent.

NORTHWOODS, Winterbourne, Bristol.

Telephone and Telegrams: Winterbourne 18.

This beautiful mansion in fifty acres of secluded grounds was built specially for the TREATMENT OF MENTAL ILLNESS. Voluntary boarders and certified patients of both sexes. Thorough clinical, bacteriological, and pathological examinations. Separate bedrooms. Private suites. Indoor and outdoor amusements. Wireless and other concerts. Occupational therapy. Physical drill. Garden and dairy produce from farm on the estate. Reasonable terms.

For further particulars and prospectus, apply to the *Resident Physician.*

THE OLD MANOR SALISBURY

A Private Hospital for the Care and Treatment of those of both sexes suffering from MENTAL DISORDERS.

Extensive grounds. Detached Villas. Chapel. Garden and dairy produce from own farm. Terms very moderate.

CONVALESCENT HOME AT BOURNEMOUTH standing in 9 acres of ornamental grounds, with tennis courts, etc., which Patients or Boarders may visit, by arrangement, for long or short periods.

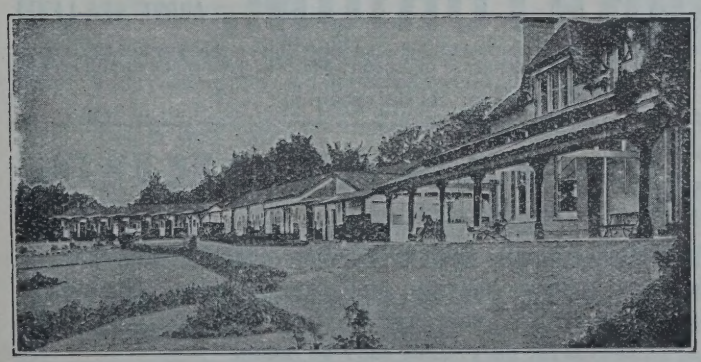
Illustrated Brochure on application to the Medical Superintendent, The Old Manor, Salisbury. Telephone: 51.

VALE OF CLWYD SANATORIUM.

This Sanatorium is established for the treatment of Tuberculosis of the Lungs and the Pleural Cavities. It is situated in the midst of a large area of park-land at a height of 450 feet above sea level, on the South-West slopes of mountains rising to over 1800 feet, which protect it from north and east winds and provide many miles of graduated walks with magnificent views. Average rainfall 29·57 per annum. Full day and night Nursing Staffs. XRay plant. Every facility for Artificial Pneumothorax and for operations on the chest. Electric Lighting. Central Heating. Home Farm. Grade A Milk from T.T. Herd.

For particulars apply to Medical Superintendent:
H. MORRISTON DAVIES, M.D., M.Ch. (Cantab.), F.R.C.S., Llanbedr Hall, Ruthin, N. Wales.

THE COTSWOLD SANATORIUM



Specially built in 1898 on the Cotswold Hills, seven miles from Cheltenham, for the treatment of Pulmonary and all other forms of Tuberculosis on Nordrach lines. Aspect S.S.W., sheltered from North and East, elevation 800 feet. Pure bracing air. SPECIAL TREATMENT by artificial PNEUMOTHORAX (X-Ray controlled), TUBERCULINS and ULTRA-VIOLET RAYS is available when necessary without extra charge. X-RAY plant. Electric light. Radiators, hot and cold basins, and Wireless in all rooms.

Full day and night Nursing Staff.

Resident Physicians: **ARTHUR H. HOFFMAN, M.D., and G. A. HOFFMAN, M.B.**

Apply: The Secretary, The Cotswold Sanatorium, Cranham, Gloucester.

Telephone: 41 *Witcombe.* *Telegrams:* "*Hoffman, Birdlip.*"

TOR-NA-DEE SANATORIUM
MURTLE, DEESIDE, ABERDEENSHIRE.

Medical Director: DAVID LAWSON, M.D., F.R.S.E.

FULLY EQUIPPED WITH *EVERY MODERN APPLIANCE* FOR THE DIAGNOSIS AND TREATMENT OF ALL FORMS OF TUBERCULOSIS & ALLIED DISEASES.

Physician Superintendent: J. M. JOHNSTON, M.B., D.P.H., etc.

Full particulars and Prospectus on application to the Secretary.

INCLUSIVE TERMS: SEVEN GUINEAS A WEEK.

RUTHIN CASTLE
(Formerly Duff House, Banff).

The first Private Hospital in the United Kingdom to be fully provided with a whole-time specially qualified Staff of Doctors, Analytical Chemists, Bacteriologists, Radiologists, Nurses, Dietists, Masseurs, and Masseuses, and a full equipment of Laboratories, X-rays, Electrocardiograph, Artificial Sunlight, and Medical Baths.

The Hospital is equipped for the diagnosis and treatment of any form of ill-health, except Mental and Infectious Diseases. The fees are inclusive.

The climate is mild and the neighbourhood beautiful.

Apply: THE SECRETARY, Ruthin Castle, North Wales.

Telegrams: CASTLE, RUTHIN. *Telephone:* 66 RUTHIN.

MUNDESLEY SANATORIUM

Specially built for the treatment of Pulmonary and other forms of Tuberculosis. Aspect S.S.W., on a carefully chosen site. Pure, bracing air. High sunshine record. Heliotherapy. Arc-light treatment. One mile from the coast. Electric light throughout. X-Ray installation. Full day and night Nursing Staff. Wireless (headphones) throughout.

Resident Physicians;

S. VERE PEARSON, M.D.(Camb.), M.R.C.P.(Lond.).
L. WHITTAKER SHARP, M.B.(Camb.).
ANDREW MORLAND, M.B. (Lond.)

Apply: Mr. D. C. FORD, Secretary, The Sanatorium, Mundesley, Norfolk

DARTMOOR SANATORIUM. 750 FEET ABOVE SEA-LEVEL

Established 1903 for Treatment of Pulmonary and other forms of Tuberculosis. Sheltered Situation on the slopes of the bracing moorland. Radiographic Installation, Electric Light, Central Heating, Separate Bedrooms, Efficient Treatment combined with individual comfort and minimum restrictions. Illustrated Prospectus on request to the Resident Physician: C. H. BERRY M.R.C.S., L.R.C.P., Dartmoor Sanatorium, Chagford, Devonshire. Telephone: 11 CHAGFORD.

PRIOR PLACE SANATORIUM
HEATHERSIDE, CAMBERLEY.

RECENTLY OPENED FOR THE TREATMENT OF PULMONARY TUBERCULOSIS.

WELL SITUATED ON HIGH GROUND AND SURROUNDED BY PINES AND HEATHER.

RESIDENT MEDICAL SUPERINTENDENT: Dr. H. O. BLANFORD, late Medical Superintendent, King Edward VII. Sanatorium, Midhurst, to whom applications for particulars may be made.

FARMWOOD, ASCOT FOR THE TREATMENT OF TUBERCULOSIS

This Sanatorium is situated at Sunninghill, amid the pines. It stands 500 feet above sea level. All forms of treatment are available. X-ray Installation. Wireless installed in all rooms. Full Nursing Staff.

Terms 6 to 8 guineas per week. **ONE HOUR BY ROAD OR RAIL FROM LONDON.**

Resident Medical Superintendent—BERKELEY N. ASH, M.R.C.S., L.R.C.P., late Physician, Pendyffryn Hall, North Wales; 1st M.O. King Edward VII Sanatorium, Midhurst.

For full particulars apply to the SECRETARY, FARMWOOD, ASCOT. *Telephone: ASCOT 519.*

BOURNEMOUTH HYDRO

Plombière Lavage, Electrical, Massage, and Thermal Treatment: Brine, Turkish, Nauheim, and Radiant Heat Baths.

DIATHERMY, ULTRA-VIOLET LIGHT.

Resident Physician—W. JOHNSON SMYTH, M.D. *Tel.* 341.

SMEDLEY'S HYDRO.

MATLOCK. Established. 1853.

Physicians: G. C. R. Harbinson, M.B., B.Ch.
R. MacLelland, M.D., C.M. (Edin.).

Prospectus and full information on application to the Manager.

DROITWICH SPA

Famous for its natural Brine Baths which will cure Rheumatism and Allied Ailments.

RAVEN HOTEL or PARK HOTEL

famous for their comfort and hospitable service to each and every one of their guests.

Adjoining Brine Baths. 230 rooms. Extensive grounds. Golf, tennis, mixed bathing. Lock-up garages and cars for hire. Illustrated booklet on request. 'Phone: 50 or 38.

PEEBLES HYDRO.

Beautifully situated 600 feet above sea level. Facing South, completely sheltered from North and East.
21 miles from Edinburgh.

All modern Baths, Douches, Massage and Electrical Treatment. Ultra-violet-Radiation. Physician in attendance.

IDEAL HEALTH RESORT.

Electric Light, Central Heating, Electric Lift, Three Billiard Tables, Ball Room, Winter Garden, Swimming Bath, Hard and Grass Tennis Courts, Badminton, Croquet Lawn, Golf Course
Prospectus from Manager. 'Phone: Peebles 2.

PARK SANATORIUM

(FORMERLY SANATORIUM TURBAN)

DAVOS-PLATZ, SWITZERLAND.

First-class house, 5,150 ft. above sea-level. Large park and wood belonging to the sanatorium. Terms for board and residence, including room, medical treatment, etc., from £5 12s. per week. Prospectus.

Medical Superintendent, F. BAUER, M.D.

THE RESIDENTIAL TREATMENT OF ALCOHOLISM & DRUG ADDICTION.

RENDLESHAM HALL

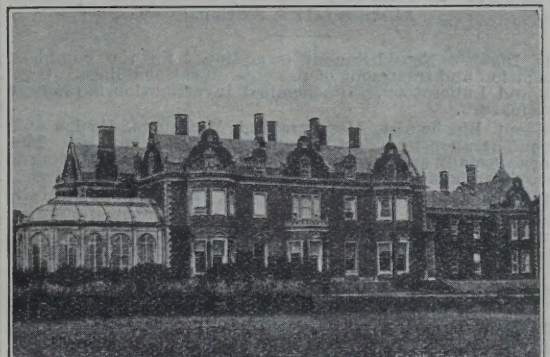
(Postal Address), WOODBRIDGE, SUFFOLK

RENDLESHAM HALL, which is open to receive patients, is essentially a Sanatorium. Its daily life and routine are that of an ordinary comfortable holiday or health resort, or of a large country house. Each patient has all the privileges of a guest consistent with the prescribed medical treatment.

Rendlesham Hall has 45 Bedrooms, and about 450 acres of Gardens and Park. It has also a private Nine-hole Golf Course, Tennis and Croquet Lawns, and Bowling Green.

Illustrated Booklet, giving particulars as to terms, etc., can be had on application to THE RESIDENT MEDICAL SUPERINTENDENT.

Telegrams and Telephone:
WICKHAM MARKET 16.



RENDLESHAM HALL

To those desiring to be nearer London,

THE MANSION, BECKENHAM PARK, BECKENHAM,

as carried on for the last twenty years, is available.

Booklet and particulars from THE RESIDENT MEDICAL SUPERINTENDENT.

Telephone: RAVENSBOURNE 0648. *Telegrams:* NOROTORIUM, BECKENHAM

Proprietors: THE NORWOOD SANATORIUM, LIMITED.

INEBRIETY.

Telephone: 16 Rickmansworth

DALRYMPLE HOUSE, RICKMANSWORTH, HERTS.

For the treatment of Gentlemen under the Act and privately. Established 1883 by an association of prominent medical men and others for the study of inebriety; profits, if any, are expended on the institution. Large secluded grounds on the banks of the river Colne. Full sized billiards, tennis, croquet, bowls. Golf (Moor Park and Sandy Lodge) close by.—Apply to F. S. D. Hogg, M.R.C.S., &c., Res. Med. Supt.

ALCOHOLISM, DRUG HABIT and NEURASTHENIA.

BAY MOUNT, PAIGNTON.

Ladies and Gentlemen treated in small Private Home
EXCELLENT RESULTS FROM MODERN TREATMENT.
SPLENDID CLIMATE AMPLE AMUSEMENT
MODERATE INCLUSIVE TERMS.
Prospectus, report, etc., from STANFORD PARK, M.B., Ch.B., Res. Med. Supt. *Phone: Paignton 5110.*

ALCOHOLISM, OTHER DRUG HABITS, and TROPICAL Ailments

THE HARE NURSING HOME

As founded and established by the late Dr. FRANCIS HARE, for 30 years Med. Supt. of The Norwood Sanatorium, and author of "Alcoholism," etc.; for the treatment of ALCOHOLISM, other Drug Habits, Insomnia, Neurasthenia, Functional Nervous Disorders, TROPICAL Ailments, etc.

"THE OLD HILL HOUSE," CHISLEHURST, KENT.

Terms Moderate. Quiet and pleasant situation.
Ladies and gentlemen admitted for treatment.
For prospectus, etc., write or phone, WALTER E. MASTERS, M.D., M.R.C.S., D.P.H., Barrister-at-law (Res. Med. Supt.)
Phone: Chislehurst 451. Telegrams: "Masters," Chislehurst.

FUNCTIONAL NERVOUS DISORDERS ALCOHOLISM and DRUG ADDICTION

at CALDECOTE HALL, NUNEATON.

This Mansion has been opened upon the most modern and scientific lines both physical and mental.
Resident Medical Superintendent—
A. E. CARVER, M.A., M.D., M.R.C.S., D.P.H., D.P.M.
Full particulars upon request.
Prospectus from the SECRETARY, 40, Marsham Street, Westminster, S.W.1

Preston Deanery Hall, Northampton.

3½ miles L.M.S. Station.

This Dietetic Establishment is equipped for the complete investigation and treatment of patients on rational lines. Own X ray and Laboratory. Biochemical investigation is made a special feature.

Resident Biochemist, Masseurs and Masseuses, Hydro and Electro Therapeutics, Fasting on Scientific Principles. The Staff are specially qualified to deal with the errors of Metabolism and provision is made for the treatment of Tropical Diseases.

Further particulars from the Secretary, Preston Deanery Hall, Northampton. Tel.: Hardingstone 6.

PRIVATE PATIENTS.

London County Council.—

Accommodation for Male Paying Patients is provided at the LONDON COUNTY MENTAL HOSPITAL, Claybury, Woodford Bridge, Essex.

The hospital is thoroughly equipped for modern treatment of certified cases.

Terms, exclusive of clothing and special luxuries, for patients having a legal settlement in the County of London, 44s. 11d. a week; for others, 48s. 5d. a week.

Full particulars from the Medical Superintendent, Claybury Mental Hospital, or from the Acting Chief Officer, Mental Hospitals Department, The County Hall, S.E.1.

Telegraphic Address: "Relief, Old Catton." Telephone: 290 Norwich

NERVOUS & MENTAL AFFECTIONS.

Ladies only received.

The Grove, Old Catton, Norwich.—

A High-class Home for the Curative Treatment of Nervous Affections. Voluntary Boarders are also received without certificates.

For full particulars apply to the Misses McLINTOCK, or to Dr. S. BARTON, 34, Surrey-street, Norwich, Visiting Physician.

YARROW HOME and HOSPITAL for CHILDREN,

BROADSTAIRS.

For the early and Preventive Treatment of Diseases and Convalescence after Illness.

The Hospital is intended for the Children of Members of the Institution of Civil Engineers, the Children of Architects, Artists, Authors, Clergymen, Members of the Medical, Legal and other Professions, Members of Scientific Societies, Officers of the Navy, Army and Royal Air Force, Officers of the Merchant Navy, Schoolmasters, and University Professors.

Accommodation is provided for 50 Boys between the ages of 4 and 12 years, and 50 Girls between the ages of 4 and 14 years. In special cases the age limits may be raised to 14 for Boys and 16 for Girls.

Fee 21/- per week
or as may be arranged, and travelling expenses.

Particulars can be obtained from the Secretary :—
116, Victoria Street, Westminster, LONDON, S.W.1.

NORTHUMBERLAND HOUSE,

GREEN LANES,

FINSBURY PARK, N.4.

A PRIVATE HOME for the treatment of patients of both sexes suffering from Mental Illnesses.

Private suites. Voluntary Boarders received without certificates.

For further particulars apply to the Medical Superintendent.

Tel.: North 0988. Telegrams: "SUBSIDIARY, LONDON."

BAILBROOK HOUSE,

BATH

A PRIVATE HOME for the Care and Treatment of persons with Mental and Nervous Disorders.

Voluntary Boarders received in the Villas. Large Mansion on outskirts of Bath, with 20 acres of grounds (see *Medical Directory*, page 2134).

For terms apply to SAMUEL J. GILFILLAN, O.B.E., M.B., C.M.Edin., Resident Physician.

Telephone No.: BATHEASTON 8189.

STRETTON HOUSE

Church Stretton, Shropshire.

A PRIVATE HOME for the treatment of gentlemen suffering from Mental and Nervous Illness, including the allied Disorders of Alcoholism and the Drug Habit. All types of early Mental and Nervous Cases are received without certificates as Voluntary Boarders. Bracing hill country. See "Medical Directory," p. 2195.—Apply to Medical Superintendent. 'Phone 10 P.O., Church Stretton.

PORTSMOUTH CITY MENTAL HOSPITAL.

Accommodation is provided for the reception of PRIVATE PATIENTS of both sexes in three detached Villas, which are healthily and pleasantly situated in extensive grounds with sea views.
Charges from 3 guineas weekly, including all necessaries except clothing.—Apply to the Medical Superintendent and Resident Physician, THOMAS BEATON, O.B.E., M.D., M.R.C.P.

MALLING PLACE, KENT

For LADIES and GENTLEMEN of Unsound Mind.

Terms Moderate: Apply to Resident Medical Superintendent.
Telegrams: ADAM WEST MALLING. Telephone: No. 2 MALLING.

THE WARNEFORD, OXFORD.

HOSPITAL FOR MENTAL DISORDERS.

President: The Right Hon. the EARL OF JERSEY.

This Registered Hospital, for the Treatment and Care, at moderate charges, of Mental Patients belonging to the educated classes, stands in a healthy and pleasant situation on Headington Hill, near Oxford. Voluntary Boarders are also received for treatment.—For further particulars apply to the Medical Superintendent.

CHISWICK HOUSE

A PRIVATE MENTAL HOSPITAL FOR THE TREATMENT AND CARE OF MENTAL AND NERVOUS DISORDERS.

Now removed to—

CHISWICK HOUSE, PINNER, MIDDLESEX.
Pinner 234.

A modern country house 12 miles from Marble Arch, in beautiful and secluded grounds.
Fees are from 10 guineas a week.
Voluntary Patients received for treatment.
DOUGLAS MACAULAY, M.D., D.P.M.

Grove House, All Stretton, Church STRETTON, SHROPSHIRE.

A PRIVATE HOME for the care and treatment of a limited number of Ladies Mentally Afflicted.
Climate healthy and bracing.
Apply to Dr. McClintock, Proprietor and Resident Medical Superintendent.

Carewell House Nursing Home,

443, Fulham-road, S.W.10 (opposite Redcliffe-gardens).

Chronic, Senile, Medical, and Nerve cases received. Terms moderate. Doctors' references. Telephone: Ken. 2388.

Vacancy for Resident Patient, only one

taken. Two doctors in residence, excellent rooms, good grounds. Every comfort. Beautiful country and climate by sea and moors. All forms of sport. North-west Somerset.—Address, No. 656, THE LANCET Office, 423, Strand, W.C.2.

Mental Patients (not certifiable) or

Senile, Bedridden, received in most comfortable private house in Putney. Every care. Doctor's reference.—Address, No. 658, THE LANCET Office, 423, Strand, W.C.2.

Albion House, Beverley, Yorks.

Successful Voluntary Home for WOMEN INEBRIATES. Terms 4 guineas weekly.
Apply, MATRON.

Mental Patients (not certifiable);

vacancies for two, either sex, in an ideal private country home near London. Physician and nursing Sister in residence. Moderate terms, many amenities. Write, Box 821, Aldridge's Advertising Service, 34, Paternoster-row, E.C.4.

City of London Hospital for Diseases OF THE HEART AND LUNGS, Victoria Park, E.2.

(Bus, tram, and rail, Cambridge Heath, L. & N.E. Railway.)

Applications for a post of HOUSE PHYSICIAN (Male), with copies of recent testimonials, are invited to be sent to the undersigned by Monday, October 7th, 1929.
The appointment will be for six months from November 1st, 1929. Salary at the rate of £100 per annum, with board, residence, and laundry provided. GEORGE WATTS, Secretary.

Royal Free Hospital, Gray's Inn-road, W.C.1.

Applications are invited from duly qualified Medical Women for the post of CASUALTY OFFICER. Previous experience as Hospital Resident essential. Salary £150 per annum. Intending candidates should submit applications, stating age and accompanied by copies of three recent testimonials, to the undersigned before the 5th October, 1929. The appointment is tenable for six months from 1st November, 1929.
REGINALD R. GARRATT, Secretary.

Evelina Hospital for Children,

Southwark, S.E.—The Committee of Management requires a HOUSE SURGEON (Male) from 1st October to 12th April, 1930 (during first two months duty in Casualty and O.P. Dept.). Salary at £120 per ann., with board and residence.
Candidates (duly registered) to send applications, giving age and qualifications (with dates), and copies of four testimonials, to the Secretary at the Hospital, before 24th September.
Applicants will be informed if they will be interviewed by the Medical Committee. Selected candidates must attend Committee of Management. Time and place of meeting will be notified by the undersigned, from whom rules and other particulars relating to the post must be obtained.
By order of Committee of Management.
H. C. S. SMITH,
10th September, 1929. Secretary-Superintendent.

Metropolitan Borough of Lewisham.

ASSISTANT MEDICAL OFFICER OF HEALTH AND MATERNITY AND CHILD WELFARE MEDICAL OFFICER.
The Lewisham Borough Council invite applications from duly qualified medical men for the appointment of Assistant Medical Officer of Health and Maternity and Child Welfare Medical Officer.
The salary will be at the rate of £650 per annum inclusive, rising by annual increments of £25 to £750 per annum inclusive.
The person appointed will be required to give whole time to the duties of the office, and will be under the administrative control and supervision of the Medical Officer of Health. He will be required to live within the Borough.
The appointment is subject to the approval of the Ministry of Health and to the provisions of the Local Government and Other Officers' Superannuation Act, 1922, and also subject to three months' notice on either side to terminate the same.
Preference will be given to candidates (*a*) who have special experience in Maternity and Child Welfare Work, and (*b*) those holding, in addition to other qualifications, a Diploma in Public Health.
Selected candidates will be required to undergo a medical examination.
Applications for the appointment, accompanied by copies of not more than three recent testimonials, must be made on forms to be obtained from the undersigned, and should be received here not later than 4 P.M. on Monday, the 30th September, 1929.
Canvassing, directly or indirectly, is prohibited, and will disqualify. JOHN W. SHUTER, Town Clerk.
Lewisham Town Hall, Catford, S.E.6. September 7th, 1929.

The Hospital for Sick Children, Great Ormond-street, London, W.C. 1.

A HOUSE SURGEON and a HOUSE PHYSICIAN are required on the 4th and 14th October respectively.
Gentlemen are invited to send in their applications, addressed to the Secretary, before 12 o'clock, on Monday, 30th September, 1929, with copies of not more than three testimonials given specially for the purpose, and also evidence of their having held a responsible hospital appointment.
The appointments are made for six months. Salaries at the rate of £100 per annum, laundry allowance £5, board and residence in the Hospital.
Candidates must be unmarried and possess a legal qualification to practice.
All Candidates must be in attendance to appear before the Joint Committee, if required, at their Meeting on Wednesday, 2nd October, 1929, at 4.45 P.M. precisely.
Forms of application and copies of the Rules may be obtained from the Secretary.
By order of the Board of Management,
JAMES MCKAY, Secretary.
September, 1929.

The Hospital for Sick Children, Great Ormond-street, London, W.C. 1.

An ASSISTANT PATHOLOGIST and RESEARCH FELLOW is required in the Pathological Department on 3rd October, 1929.
Gentlemen are invited to send in their applications, addressed to the Secretary, accompanied by copies of not more than three testimonials given specially for the purpose, before 12 o'clock, on Monday, 30th September, 1929.
The appointment is whole-time and is non-resident.
The appointment is made for one year, but the successful Candidate will be eligible for re-appointment.
Salary £450 per annum, and allowance for substitute for annual holiday, 24 guineas.
The Assistant Pathologist and Research Fellow will devote half his time to the routine bacteriological and serological work of the Hospital, and the other half to the carrying out of Research work, primarily in connection with Rheumatism. Preference will therefore be given to candidates who have shown their aptitude for Research by their previous experience or publications.
Candidates must be Registered Medical Men, and be prepared to take up the duties on 3rd October, 1929.
All candidates must be in attendance to appear before the Joint Committee, if required, at their Meeting on Wednesday, 2nd October, 1929, at 4.45 P.M.
Forms of Application, copy of the Rules and details of the duties of the Appointment, will be supplied on application to the Secretary.
By order of the Board of Management,
JAMES MCKAY, Secretary.
September, 1929.

Queen's Hospital for Children,
Hackney-road, London, E.2.

CASUALTY OFFICER required on November 26th. A six months' appointment. Salary £100 a year, with board, residence, and washing. Preference given to candidates who have previously held Resident appointments. Applications must be made on forms to be obtained from the Secretary, and must be sent in, with copies of not more than four testimonials, on or before October 30th. T. GLENTON-KERR, Secretary.
9th September, 1929.

Queen's Hospital for Children,
Hackney-road, London, E.2.

HOUSE PHYSICIAN required on December 1st. Six months' appointment. Salary £100 a year with board, residence, and washing. Preference given to candidates who have previously held Resident appointments.

Applications must be made on forms to be obtained from the Secretary, and must be sent in, with not more than four testimonials, on or before October 30th.
September 9th, 1929. T. GLENTON-KERR, Secretary.

West Middlesex Hospital, Isleworth.

APPOINTMENT OF RESIDENT ASSISTANT MEDICAL SUPERINTENDENT.

The Guardians invite applications for the appointment of Resident Assistant Medical Superintendent and Assistant Medical Officer of their Warkworth House Institution and Scattered Homes, which are adjacent, from Medical Practitioners with previous experience in major surgery and of administration in similar Institutions.

Commencing inclusive salary £450 per annum, rising, upon approved service, on the 1st October, 1930, and thereafter annually by £50, to £600 per annum, together with residential emoluments valued for superannuation purposes at £90 per annum. All fees received are to be repaid to the Guardians.

Applications, upon forms to be obtained by forwarding a stamped addressed foolscap envelope, are to be returned to the undersigned before 10 A.M. on Tuesday, the 24th September, 1929.
F. E. HARMSWORTH, Clerk to the Guardians.
Toolands House, 34, Twickenham-road, Isleworth, Mddx.
10th September, 1929.

London Jewish Hospital, Stepney
Green, E.1. (108 Beds.)

The Council of Management invite applications for the ollowing posts:—

HONORARY ASSISTANT SURGEON IN THE GYNÆCOLOGICAL DEPARTMENT, with charge of Out-patients.

Candidates must be Fellows of the Royal College of Surgeons of England, Edinburgh, or Ireland, or Masters of Surgery of London University.

HONORARY ASSISTANT RADIOLOGIST.

HONORARY MEDICAL OFFICER IN CHARGE OF THE ACTINO-THERAPEUTIC DEPARTMENT, who will be required to attend the Department at least twice a week.

Candidates desiring to make application for any of the above posts must send twenty copies of the applications, with copies of three recent testimonials to the Secretary at the Hospital before Friday, the 4th October, 1929.

The Prince of Wales's General
HOSPITAL, Tottenham, N.15.

The following Resident posts will be vacant on the 1st November next:—

SENIOR HOUSE PHYSICIAN, SENIOR HOUSE SURGEON, AND SPECIAL HOUSE SURGEON.

Salaries at the rate of £120 per annum.

JUNIOR HOUSE PHYSICIAN and TWO JUNIOR HOUSE SURGEONS.

Salaries at the rate of £90 per annum, board, residence, and laundry.

Appointment held for six months, but holders are eligible for reappointment for a further term.

Candidates (male) must be fully qualified and registered, and applications (on prescribed form), together with copies of three recent testimonials, should be sent to me on or before the first post on Tuesday, 1st October. FREDK. W. DREWETT, Director.
September 9th, 1929.

County of London.

The London County Council invites applications for appointments as EIGHTH ASSISTANT MEDICAL OFFICER (Man or Woman) in its Mental Hospitals Service. Candidates must be under thirty-five years of age and be registered to practise both in Medicine and Surgery in England. Salary £300 a year, rising by annual increments of £25 to £400 a year, plus fluctuating temporary additions, the present total commencing remuneration being approximately £423 a year. No emoluments. Charges made for board, lodging, &c. (at present £2 9s. weekly) if required to be resident. In the case of women marriage terminates contract of service. Candidate appointed will be pensionable under the Asylums Officers' Superannuation Act, 1909. Form of application, on which full particulars are given, can be obtained from the Acting Chief Officer, Mental Hospitals Department, The County Hall, Westminster Bridge, S.E.1. Completed applications must be received by Tuesday, 1st October. Canvassing disqualifies. MONTAGU H. COX.
Clerk of the London County Council.

Astley Cooper Studentship.
GUY'S HOSPITAL.

This Studentship, tenable at Guy's Hospital Medical School, is now vacant.

The Student, who is called the "Astley Cooper Assistant to the Curator of the Gordon Museum," will be elected in the first place for a period ending in July, 1930, but will then be eligible for re-election for three years.

Particulars regarding the Studentship can be obtained from the Secretary to the Astley Cooper Trustees, Medical School Office, Guy's Hospital, S.E. 1, to whom applications for the post should be addressed on or before October 7th, 1929.

Royal Free Hospital, Gray's Inn-road,
W.C.1.—Applications are invited from duly qualified and registered Medical Men for the post of SENIOR RESIDENT MEDICAL OFFICER vacant on 1st December, 1929, and tenable for one year. Salary £150 per annum, with board and residence. Intending candidates should submit applications stating age and experience, accompanied by copies of three recent testimonials, to the undersigned on or before 5th October, 1929. REGINALD R. GARRATT, Secretary.

London Temperance Hospital,
Hampstead-road, N.W.1.

Applications are invited for the post of RESIDENT MEDICAL OFFICER.

The appointment will be for a period of six months at a salary of £175 per annum, and will date as from October 11th, 1929.

Ceteris paribus, preference will be given to abstainers and to those who have held resident posts.

Candidates must submit applications, stating qualifications, age, &c., with copies of not more than three testimonials, by Thursday, the 3rd October, addressed to the Secretary.

The London Lock Hospital, 91, Dean-
street, W. 1.—The Board of Management invite applications for the post of HOUSE SURGEON at the Male Lock Hospital. Candidates must be doubly qualified and duly registered. Salary at the rate of £200 per annum, with furnished flat, full board, and laundry. The appointment to be for six months. Duties to commence October 10th, 1929. Applications, enclosing copies (only) of three recent testimonials, to be sent to the undersigned at the Male Lock Hospital, 91, Dean-street, W., on or before 23rd September, 1929.
By Order of the Board.
H. J. EASON, Secretary.

Hospital of St. John & St. Elizabeth,
60, Grove End-road, N.W.8.

Applications are invited for the post of RESIDENT HOUSE SURGEON (Male). The appointment will be for six months from November 1st, 1929. Salary at the rate of £75 per annum, with full board. Applications, together with three testimonials, should reach the undersigned not later than October 1st, 1929.
September, 1929. F. DUDLEY HOBB, B.A., Secretary.

Parish of St. John, Hampstead.

The Guardians of the above Parish require a JUNIOR RESIDENT ASSISTANT MEDICAL OFFICER at their New End Hospital to start duties as soon as possible. Appointment six months, renewable at option of the Guardians. Salary £200 per annum, with board, lodging, and washing. Further particulars can be obtained from the Medical Superintendent. Applications to be sent to my office on or before 10 A.M. Thursday, 26th September.
H. WESTBURY PRESTON, Clerk to the Guardians.
Guardians' Offices, New End, Hampstead, N.W.3.

Seamen's Hospital Society.—The
Committee of Management invite applications for the appointment of SURGEON with charge of in-patients at the ALBERT DOCK HOSPITAL, Connaught-road, E. The elected candidate will be appointed for twelve months and will be eligible for re-election.

Candidates must be Fellows of the Royal College of Surgeons of England, or Masters of Surgery of a University in the United Kingdom.

Applications to be sent in on or before 15th October to the undersigned, from whom further particulars can be obtained.
By order.
R. E. V. BAX, Secretary.
Greenwich, 9th September, 1929.

North Middlesex Hospital, Silver-
street, Edmonton, N. 18.

MALE RESIDENT MEDICAL OFFICER required. A well-qualified gentleman desirous of good hard work is required at this Hospital with over 1000 sick beds and Out-patient Department. As experience is very extensive, the candidate should have previously held a House appointment, and preference will be given to one with knowledge of routine of Hospital work. The appointment is a whole-time one, living in. Age not over forty-five years. Salary £200 per annum, subject to terms stated on the application form. Applications in writing only to be made immediately on forms to be obtained from the Medical Superintendent and Surgical Director. NO PERSONAL INTERVIEW AT PRESENT.

Golden Square Throat, Nose and Ear

HOSPITAL, London, W.1.—Applications are invited for the following posts :—

1. HONORARY ANÆSTHETIST.
2. REGISTRAR.

Particulars may be obtained from the undersigned, by whom applications must be received on or before 4th October, 1929.

F. P. CARROLL, Secretary-Superintendent.

Golden Square Throat, Nose and Ear

HOSPITAL, London, W.1.—Applications are invited for the post of REGISTRAR. Particulars of the duties may be obtained from the undersigned, by whom applications should be received on or before 30th Sept., 1929.

F. P. CARROLL, Secretary-Superintendent.

Grosvenor Hospital for Women,

Vincent-square, S.W.1.—Applications are invited for the post of RESIDENT MEDICAL OFFICER. The appointment will be for a period of six months (or longer) at a salary of £100 per annum, to date from November 1st. Candidates must submit applications, stating qualifications, age, &c., together with copies of three testimonials, before Saturday, October 5th, to the undersigned. EDWARD DEW, Secretary.

Mildmay Mission Hospital, Austin-

street, Bethnal Green, E.2.—Applications are invited for the post of JUNIOR RESIDENT MEDICAL OFFICER (Male), which becomes vacant on Nov. 1st, 1929. Salary £100 per annum with board, residence, and laundry. The appointment is for six months.

Candidates must be registered under the Medical Acts, and the Mildmay Council is anxious that they should be fully in sympathy with the religious work of the Hospital.

Applications, with copies of recent testimonials, should be sent to the Medical Superintendent before Oct. 7th.

Mildmay Mission Hospital, Austin-

street, Bethnal Green, E.2.—Applications are invited for the post of ASSISTANT CASUALTY OFFICER (Female), which becomes vacant on Nov. 1st, 1929. The appointment is non-resident and for six months. Salary £100 per annum.

Candidates must be registered under the Medical Acts, and the Mildmay Council is anxious that they should be fully in sympathy with the religious work of the hospital.

Applications, with copies of recent testimonials, should be sent to the Medical Superintendent before Oct. 7th.

The Belgrave Hospital for Children

(Incorporated), 1, Clapham-road, S.W.9.—The Committee of Management invite applications for the posts of HOUSE SURGEON and ASSISTANT HOUSE PHYSICIAN which will become vacant on October 31st. Applicants (Men) must be fully qualified and registered. The appointments are for six months with board, residence, and washing provided. Salary at the rate of £100 per annum in each case. Applications, with copies of testimonials, stating age, to be forwarded on or before Wednesday, October 2nd. By order.

THOS. CLAPHAM, Secretary.

Queen Mary's Hospital for the East

END, E.15.

Applications are invited for the post of ANÆSTHETIST to the Dental Department of the above Hospital.

Applications, accompanied by copies of testimonials, from male candidates only, should he forwarded to the undersigned not later than the 27th of September.

The appointment carries with it an honorarium of £25 per annum, and attendance will be required on Monday mornings at 9 A.M. RAPHAEL JACKSON (Major), Secretary.

Princess Louise Kensington Hospital

FOR CHILDREN, North Kensington. (42 Beds.)—HOUSE PHYSICIAN (Woman) required for six months from November 1st. During the first three months the House Surgeon will be Senior Resident, after which a new House Surgeon will be appointed and the House Physician becomes Senior. Salary at the rate of £75 per annum for the first three months, and at the rate of £100 for last three months, with board, residence, and laundry. Applications, together with copies of three testimonials, must be submitted on a form to be obtained from the Secretary, Princess Louise Kensington Hospital for Children, St. Quintin-avenue, W.10, and must be sent in by Saturday, October 12th.

London Homœopathic Hospital

(Incorporated by Royal Charter.)
Great Ormond-street and Queen-square, Bloomsbury, W.C.1.
172 Beds.

The Board of Management are prepared to receive applications, Male or Female, for the following appointment :—
ASSISTANT SURGEON FOR DISEASES OF THE EYE.

The successful Candidate must possess or obtain a registrable University Degree, and be, or become, a Member of the British Homœopathic Society. Any candidates canvassing the Members of the Board, Medical Council, or Medical Committee are thereby disqualified.

Candidates may be required to attend a meeting of the Medical Committee.

Applications, stating age, with 35 copies of application and 35 copies of each testimonial, should be sent, addressed to the Secretary, of whom further particulars may be obtained.

September, 1929. EDWARD A. ATTWOOD, Secretary.

Applications are invited for two

appointments of HONORARY ANÆSTHETIST for duty on Tuesday and Saturday mornings respectively at the NATIONAL DENTAL HOSPITAL, Great Portland-street, W.1, and should be forwarded to the Secretary, University College Hospital, Gower-street, W.C.1., before noon on Saturday, 15th October, 1929.

London Hospital, E.1.—Applications

are invited for the post of FIRST ASSISTANT and REGISTRAR to one of the five Surgical Firms. Candidates must be Fellows of the Royal College of Surgeons. The salary is £300 per annum, which is paid by the Hospital and Medical College jointly. The appointment is for one year, and is renewable up to three years.

Applications should arrive not later than Saturday, October 12th.

Further particulars may be obtained from the House Governor. E. W. MORRIS, House Governor.

West London Hospital, Hammer-

smith, W.6.—An HONORARY REGISTRAR is required for the Throat, Nose and Ear Department. The appointment is for one year from 1st November and, subject to annual re-election, may be extended for a period not longer than three years. Applicants must be duly qualified registered Medical Practitioners.

Applications, accompanied by copies of testimonials, must reach me not later than first post on Thursday, 17th October. Candidates must attend the meeting of the Medical Council on Friday, 18th October, at 4 P.M., and prior to that date call upon and send copies of application and testimonials to each member thereof. They must not canvass members of the Board, but nevertheless must send a copy of their application and testimonials to each member thereof, and if notified be in attendance at a meeting of the Board at 5 P.M. on Tuesday, 22nd October, when the appointment will be made.

H. A. MADGE, Secretary.

West London Hospital, Hammer-

smith, W.6. (225 Beds).—Required, one Non-resident HOUSE OFFICER (part time) for Children's Department for six months from 1st November next, subject to one month's notice on either side. Applicants may be male or female. Salary at the rate of £150 per annum. Candidates must be registered under the Medical Act and have held a Resident appointment at a Children's Hospital or in the Children's Department of a General Hospital.

Applications and copies of testimonials in quadruplicate (which must be made on printed forms obtained from me) must reach me not later than first post on Friday, 11th October. Selected candidates will be required to call upon such members of the Medical Staff as directed, to be in attendance at a meeting of the Medical Council on Friday, 18th October, at 4 P.M. and the House Committee Meeting at 4.45 P.M. the same day, when the appointment will be made. H. A. MADGE, Secretary.

County of London.

The London County Council invites applications for appointment as FOURTH ASSISTANT MEDICAL OFFICER (Woman) at HORTON MENTAL HOSPITAL, Epsom, Surrey. Candidates must have had special education and experience in gynæcology, the practice of which will be one of the principal duties of the person appointed. The duties otherwise will be those allocated generally to Assistant Medical Officers at the Hospital. Applicants must be under forty years of age, and be registered to practise both in Medicine and Surgery in England. Marriage terminates contract of service. Salary £425 a year, rising by annual increments of £25 to £500 a year, plus fluctuating temporary additions, making the total commencing remuneration at present approximately £578 a year. No emoluments. Charges made for board, lodging, &c. (at present £2 9s. weekly) if required to be resident. Candidate appointed will be pensionable under the Asylums Officers' Superannuation Act, 1909. Form of application on which full particulars are given can be obtained from the Acting Chief Officer, Mental Hospitals Department, The County Hall, Westminster Bridge, S.E.1. Completed applications must be received by 10th October. Canvassing disqualifies. MONTAGU H. COX,

Clerk of the London County Council.

County of London.

The London County Council invites applications for appointment as ASSISTANT MEDICAL OFFICER at the MAUDSLEY HOSPITAL, Denmark Hill, S.E.5 (for treatment of Incipient Mental Disorder). Candidates must be under forty years of age unless in London County Mental Hospital Service, and must be registered to practise both in Medicine and Surgery in England. The position is pensionable under the Asylums Officers' Superannuation Act, 1909. Salary £300 a year, rising by annual increments of £25 to £350 a year, plus fluctuating temporary additions, the total commencing remuneration at present being about £423 a year. No emoluments. Charges made for board, lodging, &c. (at present £2 9s. weekly) if required to be resident. Full particulars and conditions of appointment on form of application (on which alone application can be made) obtainable from the Acting Chief Officer, Mental Hospital Department, The County Hall, Westminster Bridge, S.E.1. Canvassing disqualifies Applications must be received by Friday, 4th October.

MONTAGU H. COX,
Clerk of the London County Council.

Royal Southern Hospital, Liverpool.

Applications are invited for the post of MEDICAL TUTOR and REGISTRAR, to commence duty on appointment. Applications and testimonials to be forwarded to the undersigned, from whom any further particulars as to duties may be obtained, on or before Saturday, 28th September, 1929.

ALLEN NALDRETT, Superintendent and Secretary.

Royal United Hospital, Bath.

Wanted on 1st Oct. a HOUSE SURGEON. Salary £150 per annum.

The appointment will be for not less than six months, and candidates must be male, unmarried, and of British nationality.

Applications, with three recent testimonials, must be addressed to the Secretary not later than the 28th Sept.

J. M. SHEPPARD, F.C.I.S., Secretary.

Royal South Hants and Southampton HOSPITAL, Southampton.

Applications are invited for the post of CASUALTY OFFICER. Salary £120, with rooms, board, and laundry. Six months' engagement, commencing October 1st. Candidates, who must be Male and unmarried, should apply at once to the undersigned, stating age, and enclosing copies of testimonials.

By order,

HY. TRUSSON, Secretary.

Cornelia and East Dorset Hospital, Poole. (102 Beds.)

Applications are invited for the post of HOUSE SURGEON (Male).

Salary £150 per annum, with usual emoluments. Duties to commence October 1st, for six months (with option of extension for further six months). Applications, with copies of recent testimonials, to be delivered at the Hospital at the earliest possible date. E. S. FOLEY, Secretary.

Royal Buckinghamshire Hospital, Aylesbury.

Applications are invited for the post of RESIDENT MEDICAL OFFICER (Male) for six months. To commence duty about September 30th, or as soon after as possible. Salary £180 per annum, with board, residence, and laundry. Candidates must be fully qualified and registered.

Applications, stating age, qualifications, and experience, with copies of not more than three testimonials, should be sent to the undersigned at once. M. W. BROWN, Secretary.

General Hospital, Great Yarmouth. (72 Beds.)

Applications are invited for the post of SENIOR HOUSE SURGEON. Salary £150 per annum, with board, residence, and laundry. Duties to commence at once. Candidates (male and unmarried) must be fully qualified and registered.

Applications, stating age, nationality and qualifications, together with copies of three recent testimonials, to be sent immediately to the undersigned.

T. H. G. GARTLAND, Secretary.

Chester Royal Infirmary. (211 Beds.)

Wanted, HOUSE SURGEON (Male), to commence duties October 1st. Salary £120 per annum, with board, lodging, and washing. Candidates must be doubly qualified and registered.

Applications, stating age, and accompanied by copies of testimonials, to be sent to the undersigned not later than September 26th, 1929.

16th September, 1929. J. ROWSE MITCHELL, Secretary.

Royal Victoria and West Hants HOSPITAL, Bournemouth. (Poole-road Branch. 68 Beds.)

HOUSE SURGEON (Male, British nationality) required, to commence duty second week in October. Salary £120 per annum, with board, lodging, and washing. The appointment is tenable for six months, and candidates must be registered according to the Medical Act. Applications, stating place of birth, with copies of three testimonials, to be sent immediately to the undersigned. Women and married men are ineligible.

September 16th, 1929. GORDON M. SAUL, Secretary.

Royal Sussex County Hospital, Brighton. (225 Beds.)

HOUSE PHYSICIAN (Male) required immediately, with charge of beds. Salary £150 per annum, with board, residence, and laundry. Candidates must hold a Medical and Surgical qualification of the British Empire, and be duly registered under the Medical Acts. They must be unmarried, and when elected under thirty years of age. Applications, with copies of testimonials, should be sent at once to the undersigned.

L. L. W. LANCASTER-GAYE, Secretary-Superintendent.

Medical Department, SUDAN GOVERNMENT.

A MEDICAL OFFICER is required immediately for the SUDAN MEDICAL SERVICE. The Candidate must be single and should be under thirty years of age, and he must have held a Resident appointment in a large General Hospital.

Pay commences at £E720 a year, rising to £E1200 after thirteen years' service. On confirmation of his appointment, the selected candidate will be eligible for pensionable service.

Applications (in writing only), with copies of recent testimonials, should be made to Dr. HODSON, 24, Welbeck-street, W.1, from whom, and from the Secretaries or Deans of the principal Medical Schools, further particulars can be obtained.

Central Health Board, FEDERATED MALAY STATES.

Applications are invited for Three MEDICAL OFFICERS for the Estate Service of the above Board. Candidates must be of pure British descent, between the ages of twenty-five and thirty-five years, and must have held the post of House Physician and House Surgeon at a General Hospital. If they have not already taken a course at one of the recognised schools of Tropical Medicine they will be required to do so before sailing and an allowance is made for this purpose. Salary is at the rate of $700 per mensem for the first year, equivalent to £980 a year; $750 per mensem for the second year, equivalent to £1050 a year; $800 per mensem for the third year, equivalent to £1120 a year; the first term of service being for three years. Free passages are granted to successful candidates and their wives, also their children under ten years not exceeding the cost of a first-class passage, together with free furnished quarters and an allowance of $140 per mensem to cover the running costs, upkeep, and depreciation of a car ($1 equals 2s. 4d. sterling). At the end of the first term of three years' service six months' full-pay leave, exclusive of allowances, and free passages are granted. There is a provident fund in substitution of a pension fund. Candidates will be required to pass a medical examination before final selection. Further details of the Service will be given on application to The Agent, Malayan Information Agency, Malaya House, 57, Charing Cross, London, S.W. I.

University of Sydney.

The Senate invites applications from gentlemen qualified to hold the BOSCH CHAIR OF SURGERY, the duties of which commence on 1st March, 1930. The salary is £2,500 per annum, without Superannuation rights. Applications (eight copies) should reach the undersigned by 19th October, 1929, but the University reserves to itself the right to invite any person to the Chair. A memorandum giving further particulars may be obtained on request.

Agent-General for New South Wales, London.

The Senate invites applications from gentlemen qualified to hold the BOSCH CHAIR OF MEDICINE, the duties of which commence on 1st March, 1930. The salary is £2,500 per annum, without Superannuation rights. Applications (eight copies) should reach the undersigned by 19th October, 1929, but the University reserves to itself the right to invite any person to the Chair. A memorandum giving further particulars may be obtained on request.

Agent-General for New South Wales, London.

The Senate invites applications from gentlemen qualified to hold the BOSCH CHAIR OF BACTERIOLOGY, the duties of which commence on 1st March, 1930. The salary is £1,100 per annum, subject to a deduction of 5 per cent. of the University Professorial Superannuation Scheme. Applications (eight copies) should reach the undersigned by 19th October, 1929. A memorandum giving further particulars may be obtained on request.

Agent-General for New South Wales, London.

Australia House, Strand, London, W.C.2.

University of Cape Town.

APPOINTMENT OF ASSISTANT ANATOMIST.

Applications are invited for the post of Assistant Anatomist in the Department of Anatomy at the University of Cape Town.

Candidates must have a registrable Medical qualification, and must have had experience of teaching anatomy. The appointment is a whole time one, and the holder will be expected to take a responsible share in the teaching and to undertake research.

SALARY.—£750 per annum, but for pension purposes it will be regarded as being on the scale £500–25–650.

Salary will be paid from 1st February, 1930, provided the Assistant has vacated his previous post on or before 31st January, 1930, and reports for duty on or before 25th February, otherwise salary will be paid from date of assumption of duty.

The appointment is for a period of three years in the first instance.

PASSAGE MONEY.—£50 will be allowed for passage expenses, subject to a proportionate refund in the event of the Assistant terminating his agreement within three years of the date of the assumption of duty.

DUTIES.—To be assumed on 1st March, 1930.

Applications, stating age, professional qualifications, and experience, together with copies of three recent testimonials (all in duplicate), should reach the Secretary, Office of the High Commissioner for the Union of South Africa, South Africa House, Trafalgar-square, W.C.2, from whom forms of application and further particulars may be obtained, not later than the 8th October, 1929.

INDIAN MEDICAL SERVICE

RECRUITMENT OF EUROPEAN OFFICERS

Applications are invited from Medical Men for permanent commissions in H.M.'s Indian Medical Service. The terms offered include a gratuity of £1,000 on retirement after six years' service or £2,500 after 12 years' service, together with free return passages for those who no longer desire to remain in the Service. In other respects the terms will be as detailed below.

Candidates must be British subjects under 32 years of age at the time of application and must be registered under the Medical Acts in force in Great Britain and Northern Ireland.

CAREERS.

The Indian Medical Service offers wide opportunities of medical experience, including clinical, preventive, specialist, and research work. At the beginning of his career an officer is employed on the military side which has medical charge of the Indian Army. Promotion is on a time scale up to the rank of Lieutenant-Colonel, and by selection to the ranks of Colonel and Major-General. An officer may apply after two years' Indian Service for transfer to the civil side, from which appointments are made to Civil Surgeoncies, which are established at the principal civil centres to provide for the medical needs of Civil Officials and for general medical administrative purposes; to specialist (e.g., Public Health and Bacteriological) services; to research posts; and to professorships at the Medical Schools.

PAY.

The monthly rates of pay for European officers in the Service who have a "non-Asiatic" domicile are as follows:—

Rank. 1	Service in Rank. 2	Basic Pay. 3	Overseas Pay. 4	Year of Total Service. 5
		Rs.		
Lieut...	—	500	Rs.150	1st
			150	2nd
			150	3rd
Capt...	(i) During first 3 years' service as Captain ..	650	150	4th
			£15	5th
			15	6th
	(ii) With more than 3 and less than 6 years' service as Captain	750	25	7th
			25	8th
			25	9th
	(iii) With more than 6 years' service as Captain	850	25	10th
			25	11th
			30	12th
Major..	(i) During first 3 years' service as Major ..	950		
	(ii) With more than 3 and less than 6 years' service as Major	1100		
	(iii) With more than 6 years' service as Major..	1250		
Lt.-Col.	(i) Until completion of 23 years' total service ..	1500	30	13th and over.
	(ii) During 24th and 25th years' service	1600		
	(iii) After completion of 25 years' total service ..	1700		
	(iv) When selected for increased pay	1850		

Extras.—In addition to the above rates various allowances are admissible for a large number of special appointments on both the military and the civil side which may be held by members of the Indian Medical Service. Special high rates of pay are also attached to the numerous administrative appointments open to officers in both branches of the Service.

WAR SERVICE CONCESSIONS.

Any service rendered by an officer during the War as a medical or combatant officer or in a position usually filled by an officer may be counted as service for increments of pay, promotion, retirement and retired pay, but not for gratuity.

One half of any service in the ranks during the War may be counted as service for retirement and retired pay only.

OUTFIT ALLOWANCE.

Officers on appointment will receive an outfit allowance of £50.

PRIVATE PRACTICE.

With the exception of Administrative Officers, military or civil, and officers holding certain special appointments, officers are not debarred from taking private practice, so long as it does not interfere with their proper duties.

PENSIONS.

The rates of pension are as follows:—

	Per annum.
After 17 years' service for pension ..	.. £400
„ 18 „ „ ..	.. 430
„ 19 „ „ ..	.. 460
„ 20 „ „ ..	.. 500
„ 21 „ „ ..	.. 540
„ 22 „ „ ..	.. 580
„ 23 „ „ ..	.. 620
„ 24 „ „ ..	.. 660
„ 25 „ „ ..	.. 700
„ 26 „ „ ..	.. 750
„ 27 „ „ ..	.. 800

These rates are subject to alteration on account of a rise or fall in the cost of living as compared with the year 1919, to an extent not exceeding 20 per cent. in all, the revision being undertaken triennially. With effect from July 1st, 1927 a reduction of 4½ per cent. has been made on this account from the amounts shown.

There are additional pensions ranging from £65 to £350 per annum for officers who have held administrative appointments.

PASSAGES.

An officer on appointment is provided with a free passage to India. The wives and families of officers who are married prior to the date of the officers' embarkation on first appointment will also be provided with free passage to India subject to the payment of messing charges.

Officers and their families are also eligible for passage concessions under which they are granted a certain number of return passages home at Government expense during their service.

INSTRUCTION PRIOR TO EMBARKATION.

Officers are required to undergo courses of instruction at the Royal Army Medical College and at Aldershot, lasting approximately six months, prior to their embarkation for India on first appointment.

Full details regarding these appointments and forms of application may be obtained from the UNDER-SECRETARY OF STATE FOR INDIA, MILITARY DEPARTMENT, INDIA OFFICE, LONDON, S.W.1. Applications should be submitted as soon as possible. The Selection Committee will meet early in October to make nominations, and the selected candidates will be required to attend a course of instruction commencing about the 23rd October, 1929.

The Gloucestershire Royal Infirmary

AND EYE INSTITUTION, Gloucester. (153 Beds.)—The General Committee invite applications for the post of HONORARY EAR, NOSE AND THROAT SURGEON.

Candidates must be duly registered Practitioners.

Applications, stating age, qualifications, experience, &c., accompanied by testimonials, should be forwarded to the Secretary on or before Wednesday the 9th day of October next.

September 5th, 1929. F. J. SYMONS, Secretary.

County Borough of Barrow-in-Furness.

ASSISTANT MEDICAL OFFICER OF HEALTH AND ASSISTANT TUBERCULOSIS OFFICER.

Applications are invited for the above appointment at an inclusive salary of £600 per annum.

Candidates must be fully qualified and registered Medical Practitioners with experience in the diagnosis and treatment of Tuberculosis. The successful candidate will be required to devote the whole of his time to the duties of the Office, to assist in the general administrative work of the Department, and in the Medical Inspection of School Children, and will be under the direction of the Medical Officer of Health.

Particulars of the duties may be obtained on application to the Medical Officer of Health, Town Hall, Barrow-in-Furness.

Applications, stating age, experience, and qualifications, and endorsed "Assistant Medical Officer," and accompanied by copies of not more than three recent testimonials, must be received at my office not later than Saturday, 28th September, 1929.

Canvassing, either directly or indirectly, will be deemed a disqualification.

Preference will be given to candidates possessing the D.P.H.

W. A. CHISLETT, Town Clerk.

Town Hall, Barrow-in-Furness, 5th September, 1929.

City of Coventry.

MEDICAL OFFICER OF HEALTH.

The Coventry City Council invite applications from qualified practitioners in medicine, surgery, and midwifery, who are also holders of a diploma in public health, for the position of Medical Officer of Health of the City.

A form of application (upon which full particulars are given of the conditions of appointment and the duties of the office) may be obtained from the undersigned, and all applications must be made on the prescribed form.

Age must not exceed forty. The salary will be an inclusive salary on Grade A of the Council's scale, commencing at £1225 and rising to £1500 in the manner stated in the conditions of appointment. The post will be a designated post under the Local Government and Other Officers' Superannuation Act, 1922.

Applications must reach the undersigned not later than Saturday, the 5th October, 1929.

Canvassing, direct or indirect, will be regarded as a disqualification. FREDERICK SMITH, Town Clerk.

Council House, Coventry, 10th September, 1929.

Northamptonshire.

MEDICAL OFFICER OF HEALTH AND SCHOOL MEDICAL OFFICER.

The Northamptonshire County Council invite applications for the appointment of Medical Officer of Health and School Medical Officer for the Administrative County of Northampton.

Applicants must be legally qualified and duly registered Medical Practitioners, and hold a Diploma in Sanitary Science, Public Health, or State Medicine. They must also have had previous experience in Public Health administration under a local government authority.

The salary will be at the rate of £1100 per annum, payable monthly, together with offices, staff, stationery, and such allowances for travelling and other necessary out-of-pocket expenses as the County Council shall from time to time approve. A periodical review of salaries is made by the County Council and suitable increments of salary will be given for proved ability and satisfactory service.

The salary will be subject to a deduction of 5 per cent. per annum for superannuation in accordance with the provisions of the Local Government and Other Officers' Superannuation Act, 1922, which the County Council have adopted.

The candidate appointed will be required to pass a medical examination.

The officer appointed must reside at a place to be approved by the County Council and devote the whole of his time to the service of the Council and Education Committee; he will be responsible for the carrying out of the Public Health work now devolving upon or which may hereafter devolve upon the County Council or its Committees.

The appointment is to be held subject to the provisions of the Sanitary Officers Order, 1926, and is terminable (subject to the provisions of Section 68(5) of the Housing, Town Planning, &c., Act, 1909) upon three months' notice on either side.

Further particulars, if required, may be obtained on application to the undersigned.

Applications, endorsed "Medical Officer," with not more than three recent testimonials, giving full particulars of the training, qualifications, experience, and age of the applicant, should reach the undersigned on or before the 27th September, 1929.

Applications and testimonials for the use of members of the Public Health, &c., Committee must be printed or typewritten, and not less than thirty copies should be supplied for this purpose.

Canvassing will disqualify.

H. A. MILLINGTON, Clerk of the County Council.

County Hall, Northampton.

Norfolk & Norwich Hospital, Norwich.

HOUSE SURGEON required, to take up duties on 1st November next. Salary £120, with board, residence, and laundry. Candidates (Male), who must possess registered qualifications, should forward applications, stating age, nationality, &c., together with copies of testimonials, to the undersigned not later than the 26th September.

Rotherham Hospital. — Wanted,

HOUSE PHYSICIAN (Male), qualified. Salary £180 per annum, with board, lodgings, and laundry. To have charge of Out-patients, administer Anæsthetics, and assist Honorary Physician.

Applications, with copies of recent testimonials, to be sent to the Secretary, G. W. ROBERTS, 8, Moorgate-street, Rotherham.

The Royal Eye & Ear Hospital, Bradford.

Applications are invited for the post of JUNIOR HOUSE SURGEON (Male).

Salary £120, with board, residence, and laundry.

Applications, stating qualifications, age, &c., with copies of recent testimonials, to be forwarded to the undersigned.

F. BRIGGS, Secretary-Superintendent.

Birkenhead General Hospital.

(156 Beds.)

Applications are invited for the post of CASUALTY SURGEON (Male). Salary £100 with board and residence, to take up duties immediately.

Applications, stating qualifications, experience and nationality, with three copies of recent testimonials, to be sent to the Secretary-Superintendent as early as possible.

Manchester Babies' Hospital, Burnage-lane, Levenshulme.

—Applications are invited for the post of JUNIOR RESIDENT MEDICAL OFFICER. Appointment is for six months from November 1st, 1929. Salary at the rate of £50 per annum with laundry. Only candidates with previous Hospital experience need apply.

Applications, together with copies of testimonials, should be sent to the undersigned and marked "J.R.M.O." by Thursday, September 26th. ANGELA LOPEZ, Secretary.

Hull Royal Infirmary.

(272 Beds.)

Applications are invited for the post of ASSISTANT HOUSE PHYSICIAN (Male) at present vacant.

The appointment will be for six months in the first instance and will be terminable by one month's notice on either side.

Salary at the rate of £130 per annum with residence, board, and laundry.

Applications should be addressed to the undersigned.

September 5th, 1929. R. J. CARLESS, House Governor.

Addenbrooke's Hospital, Cambridge.

Applications are invited for the post of HOUSE SURGEON to the Special Departments. The appointment will be for six months from October 10th, 1929, but is terminable at an earlier date by one month's written notice on either side. Salary at the rate of £130 per annum, with board, residence, and laundry. Candidates (male), who must be unmarried and duly registered, are requested to forward their applications, stating age, qualifications, &c., together with copies of not more than four testimonials, to the undersigned on or before Thursday, September 26th, 1929. W. H. HEAD, Secretary-Superintendent.

The Royal Sea Bathing Hospital

FOR SURGICAL TUBERCULOSIS, Margate.

HOUSE SURGEON REQUIRED.

A Male House Surgeon is required to take up duty on October 1st next. The salary is at the rate of £100 per annum, with board, residence, attendance, and laundry.

Candidates for the post must be legally qualified and registered. The appointment is for six months.

There are 300 beds for adults and children, which afford special opportunities for the study of surgical tuberculosis.

Applications, stating age and previous appointments, with copies of three testimonials, should be sent to the Secretary, R.S.B.H. Offices, 15, York Buildings, Adelphi, London, W.C.2.

Nottingham Children's Hospital.

Applications are invited for the post of RESIDENT HOUSE PHYSICIAN (Woman). Candidates must have held a resident Hospital appointment. Experience in the administration of anæsthetics essential. The salary will be at the rate of £150 per annum, with apartments, board, and laundry. The appointment will be for six months, and the duties will commence as from the 1st November, 1929.

Applications, together with testimonials and stating age, qualifications, and experience, to be sent to F. Pragnell, the Honorary Secretary, 1, King John's Chambers, Bridlesmith Gate, Nottingham, by the 23rd September, 1929. Selected candidates will be required to attend at the Hospital for a personal interview on the 1st October, when the appointment will be made.

The Gloucestershire Royal Infirmary

AND EYE INSTITUTION, Gloucester (153 Beds).—Applications are invited for the post of FIRST HOUSE SURGEON (Male). Salary £135 per annum, with board, residence, and laundry.

The appointment is for six months which may be extended for similar periods from time to time.

Applications, stating age, qualifications, and nationality, with copies of not less than three recent testimonials, to be sent to the undersigned not later than Wednesday, October 2nd. The appointed candidate will be required to enter upon his duties on the 19th October.

September 16th, 1929. F. J. SYMONS, Secretary.

King George V. Sanatorium,

Godalming, Surrey.

Applications are invited for the appointment of JUNIOR ASSISTANT MEDICAL OFFICER (Male) at King George V. Sanatorium, Godalming, Surrey (232 beds), for Early Cases (Male adults) of Pulmonary Tuberculosis. There is no accommodation at the Sanatorium for a married officer. There are two other medical officers on the staff. Previous tuberculosis experience is not essential. Preference will be given to candidates under thirty years of age. Salary £500 per annum.

The candidate appointed will be required to reside in the institution and pay for board, lodging, and washing at the rate fixed from time to time by the Board's Finance Committee. At present the rate is £130 per annum.

Application to be made not later than 10 A.M. on Wednesday, 2nd October, on form obtainable from the Clerk, Metropolitan Asylums Board, Victoria Embankment, London, E.C.4, by forwarding stamped, addressed foolscap envelope.

ALLAN POWELL, Clerk to the Board.

10th September, 1929.

Salford Royal Hospital. (263 Beds.)

Applications are invited for the following vacancies which will occur in the Resident Medical Staff (Male) on the 30th instant:—

HOUSE SURGEON (attached to the Orthopædic Department). Salary at the rate of £125 per annum.

HOUSE SURGEON. Salary at the rate of £125 per annum.

CASUALTY HOUSE SURGEON. Salary at the rate of £125 per annum.

The appointments are for a period of six months, with board and residence.

Candidates must be registered under the Medical Acts.

Forms of application, which may be obtained from the undersigned, must be delivered without delay.

By order of the Board.

GEORGE RUDDLE,
General Superintendent and Secretary.

Salford Royal Hospital, Manchester.
September 16th, 1929.

Birmingham Union.

SELLY OAK HOSPITAL.

RESIDENT PHYSICIAN (MALE).

Applications are invited for the above post, giving age, full details of experience, and qualifications, and accompanied by copies of not more than three recent testimonials. Applications should be forwarded so as to reach the undersigned not later than Wednesday, 9th October, 1929.

Candidates must hold the degree of Doctor of Medicine of one of the Universities of the United Kingdom, or be a Fellow or a Member of the Royal College of Physicians of London or Edinburgh.

The Resident Medical Staff, including the Medical Superintendent, numbers eight.

The present Hospital accommodation consists of 540 beds for acute cases, divided into general medical, general surgical, gynæcological, obstetrical, and children's sections. Out-patient and Casualty Departments, as well as the following fully equipped special departments are attached to the Hospital: Pathological, X ray, Electro-therapeutic, Massage, Ultra-violet Ray.

The admissions and discharges for the year 1928 were 7284 and 7448 respectively.

The person appointed must devote the whole of his time to the duties of the office. He will act under the control and direction of the Medical Superintendent and will carry out such duties as may be assigned to him by such officer with the consent of the Guardians. Should occasion arise the successful applicant must be prepared to assist at any of the other Institutions in the Union without additional remuneration.

The commencing salary will be fixed between £400 and £600, according to qualifications and experience. If fixed lower than the latter figure the salary will rise to that figure by £50 annually subject to satisfactory service. The Guardians' regulations provide that at the expiration of 12 months' satisfactory service additional allowances not exceeding in all £150 per annum are granted to the holders of certain prescribed degrees and/or diplomas.

Furnished quarters, rations, laundry, and attendance, will be provided. A deducation of 2 per cent. will be made from the salary and value of the emoluments under the provisions of the Poor Law Officers' Superannuation Act, 1896.

Further particulars may be obtained, if desired, on application to the Medical Superintendent, R. P. S. Kelman, Esq., M.B., F.R.C.S. (Eng. & Edin.)

C. P. BEECH, Clerk to the Guardians.

Union Offices, Edmund-street, Birmingham.

Bedford County Hospital.—Assistant

HOUSE SURGEON (Male) fully qualified, unmarried, required for a term of not less than six months, commencing October 14th. Salary £130, with board, lodging, and laundry.

Applications, stating age, nationality, qualifications, together with three recent testimonials, to be sent to The Hon. Secretary, Medical Staff Committee, not later than Friday, 27th September. Selected candidates will be invited for an interview Wednesday, 2nd October, 1929.

The General Hospital, Birmingham.

Applications are invited for the following Resident Appointments from October 15th:

	Salary.
RESIDENT ANÆSTHETISTS (Two) ..	£120 per annum.
HOUSE SURGEONS (Three)	£70 per annum.

Applications, giving full details of qualifications and accompanied by testimonials (if desired,) should reach the undersigned by September 30th. A. H. LEANEY, House Governor.

Blackburn and East Lancashire Royal INFIRMARY.

FOURTH HOUSE SURGEON (Male) required at a salary of £130 per annum, with board, residence, laundry, &c.

The Hospital contains 240 beds, with X ray, Massage, V.D., Eye, Ear, Nose & Throat Departments, Pathological Laboratory, &c. There is no outside work.

Applications, with copies of testimonials, stating age, nationality, experience, &c., to be sent at once to the undersigned.

NATHAN A. SMITH, General Supt. and Secretary.

Royal Infirmary, Blackburn.

David Lewis Northern Hospital,

Liverpool.

RESIDENT MEDICAL OFFICERS.

Applications are invited for the following:—

ONE HOUSE SURGEON,
ONE HOUSE PHYSICIAN,

to commence duties from the 1st of October for a period of six months.

Salary at the rate of £100 per annum, with full board.

Applications and testimonials to be in the hands of the Secretary-Superintendent on or before the 23rd of September, 1929. H. LEVEY, Secretary-Superintendent.

County Mental Hospital, Stafford.

SECOND ASSISTANT MEDICAL OFFICER, male, single, required. Salary £600, rising by £25 per annum to £700; £50 per annum in addition if or when in possession of Diploma in Psychological Medicine. £130 per annum will be charged for furnished quarters, board, laundry, and attendance.

Every opportunity afforded for study and research, serodiagnosis, &c., in well equipped laboratory. Applications will be considered only from candidates with some experience of laboratory work.

Appointment subject to conditions of Asylums Officers' Superannuation Act, 1909.

Applications, stating age, qualifications, &c., and enclosing copies of recent testimonials, to be addressed to the Medical Superintendent.

Bristol City and County Mental HOSPITAL.

SECOND ASSISTANT MEDICAL OFFICER.

Applications are invited from unmarried gentlemen, duly qualified and registered, and not over thirty-five years of age, for the above post. Salary commencing at £500, rising by two annual increments of £25 to £550 per annum, with board, apartments, laundry, and attendance. £50 in addition if possessing a Diploma in Psychological Medicine. Fully equipped laboratory with trained assistant for research and clinical pathology. Previous experience essential. The appointment is subject to the Asylum Officers' Superannuation Act, 1909. Application forms, which should be obtained from the Medical Superintendent, should reach him at the Mental Hospital, Fishponds, Bristol, completed, with copies of three testimonials, by Monday, 30th September. JOSIAH GREEN,

Clerk to the Visiting Committee.

The Council House, Bristol, 13th September, 1929.

Bristol City and County Mental HOSPITAL.

THIRD ASSISTANT MEDICAL OFFICER.

Applications are invited from unmarried gentlemen, duly qualified and registered, and not over thirty-five years of age for the above post. Salary commencing at £350, rising by four annual increments of £25 to £450 per annum, with board, apartments, laundry, and attendance. £50 in addition for Diploma in Psychological medicine. Fully equipped laboratory with trained assistant for research and clinical pathology. Previous experience is not essential. The appointment is subject to the Asylum Officers' Superannuation Act, 1909. Application forms, which should be obtained from the Medical Superintendent, should reach him at the Mental Hospital, Fishponds, Bristol, completed, with copies of three testimonials, by Monday, 30th September. JOSIAH GREEN,

Clerk to the Visiting Committee.

The Council House, Bristol, 13th September, 1929.

Manchester Ear Hospital, Grosvenor-square, All Saints.—Non-resident HOUSE SURGEON required. Salary at the rate of £150 per annum, with partial board. Appointment for six months. Applications, with copies of four recent testimonials, to be forwarded not later than March 16th to Mr. REGINALD S. MILFORD (Hon. Sec. Manchester Ear Hospital), c/o Mr. W. J. Ellam, 33, Brazennose-street, Manchester.

Swansea Hospital (316 Beds).—HOUSE SURGEON wanted. Gentleman, single. Salary £150 per annum with board, residence, and laundry.

Applications, stating age, nationality, qualifications, and experience, together with copies of three recent testimonials, to be forwarded to the undersigned.

O. C. HOWELLS, Secretary.

Stockton and Thornaby Hospital, Stockton-on-Tees. (140 Beds).—Applications are invited for the post of JUNIOR RESIDENT MEDICAL OFFICER (Male). Salary £150 with residence, board, and laundry. Candidates for the above post must be doubly qualified and unmarried, and are required to commence duties on or about 1st October. Application, stating age, nationality, and experience, together with copies of three recent testimonials, to be sent to the undersigned as early as possible.

J. WILKINSON, Secretary.

Aberystwyth Infirmary and Cardiganshire GENERAL HOSPITAL. (40 Beds.)—HOUSE SURGEON required (Male). Salary £200 per annum with board, residence, and laundry. Candidates must be fully qualified and registered and must be experienced anæsthetists; knowledge of X ray a consideration. Knowledge of Welsh desirable. Applications, stating age and qualifications, together with three recent testimonials, to be sent by Monday, October 7th, 1929, to the Secretary, The Infirmary, Aberystwyth.

Royal Devon and Exeter Hospital, Exeter.

HONORARY PHYSICIAN.

Applications are invited for the post of Honorary Physician at this Hospital.

Candidates must be Fellows or Members of the Royal College of Physicians of London and Doctors of Medicine of one of the Universities of the United Kingdom, and if appointed must practise as a Physician.

Particulars as to duties, &c., may be obtained from the undersigned.

Applications, together with certificates of birth and registration, original testimonials with 35 copies, should be delivered to the undersigned not later than Saturday, 26th October.

Signed on behalf of the Committee.

S. S. COLE, Secretary.

N.B.—Canvassing of any member of the Standing Elective Committee is forbidden by the rules of the Hospital.

County Borough of Stockport.

CLINICAL TUBERCULOSIS OFFICER AND SENIOR ASSISTANT MEDICAL OFFICER OF HEALTH.

Applications are invited from duly qualified and registered Medical Men for the above appointment.

The possession of a Degree or Diploma in Public Health is essential, and preference will be given to candidates with experience in the diagnosis and treatment of Tuberculosis and Venereal Diseases.

The salary attached to the position will be £750 per annum, rising by annual increments of £25 to a maximum of £850 per annum (no bonus).

Forms of application and particulars of the duties, &c., of the office can be obtained by application to Dr. N. Gebbie, Medical Officer of Health, Town Hall, Stockport.

Applications, endorsed "Assistant Medical Officer of Health," should reach me not later than 9th October, 1929.

ROBERT HYDE, Town Clerk.

Town Clerk's Office, Town Hall, Stockport.
16th September, 1929.

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Applications, giving full particulars, accompanied by copies of three testimonials, should be addressed to the Chairman of Directors, Evans Sons Lescher & Webb, Ltd., 56, Hanover-street, Liverpool.

Woman M.B., B.S.Lond., requires ASSISTANTSHIP to another medical woman. Previous experience in private practice, dental surgery and anæsthetics. Can drive car.—Address, No. 657, THE LANCET Office, 423, Strand, W.C.2.

Wanted, part-time work as Secretary; experienced electrical treatment, light, and massage. Three years' reference Harley-street doctor and previously.—Address, No. 659, THE LANCET Office, 423, Strand, W.C. 2.

Doctor's Widow (aged 40), competent, trustworthy, and with business experience, seeks post as Secretary-housekeeper or Matron. Has good experience in running a medical household, accustomed to interviewing, and capable of keeping books, also a competent housekeeper.—Address, No. 652, THE LANCET Office, 423, Strand, W.C.2.

Woman Owner-driver wishes to drive Doctor two or more days a week, by arrangement or regularly.—Hord, 29, Dalebury-road, S.W.17. 'Phone: Battersea 1682.

London, S.W. — Junior Partner required for large cash and panel Practice. Share worth £500 per annum for disposal. Good opportunity for young and energetic practitioner.—Apply, Peacock and Hadley, Ltd., 19, Craven-street, Strand, W.C. 2.

To Purchasers.—Do not Buy without expert assistance. With forty years' experience, Mr. PERCIVAL TURNER can advise in all cases. Terms free on application to 4, Adam-street, Strand, W.C.2. Telephone: Temple Bar 9011. Telegrams: "Epsomian, London."

Practice with appts. total £1200. Brit. colony, lovely hill climate. Suit married man with short experience. Free house, living cheap; games an asset. Small premium, vacant April.—Address, No. 643, THE LANCET Office, 423, Strand, W.C.2.

Essex. — Death Vacancy. — Third Share of an old-established middle-class Practice, total receipts of which average £2800 a year. Medium-sized house available; rent £80. Premium 2 years' purchase for third share, vacant through death of one of the partners.—Apply, Peacock and Hadley, Ltd., 19, Craven-street, Strand, W.C. 2.

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Surrey.—Nice Residential Town.— Mixed-class PRACTICE. Receipts last year £600, including fair panel. Good house and garage on long lease; rent £150. Premium £750. Practice growing steadily.—Apply, Peacock and Hadley, Ltd., 19, Craven-street, Strand, W.C. 2.

Death Vacancy — Seaside town.— Excellent surgical opportunities. First-class house available.—Address, No. 649, THE LANCET Office, 423, Strand, W.C.2.

Kent. — Old-established Country PRACTICE; £1100 per annum. Good house and grounds. Two reception, 6 bedrooms; separate entrance for Surgery, &c. Premium for Practice £1625.

Address, No. 655, THE LANCET Office, 423, Strand, W.C.2.

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An Ideal Residence for a Doctor. 7 bedrooms; bathroom (h. & c.), 3 sitting rooms; excellent offices. Garage. All in first-class repair. Very pretty garden. Lovely country views from back of house. Substantial part of purchase money can remain on mortgage.—Apply, Mr. Robert Thake, Chartered Surveyor, Estate Offices, Salisbury.

Sussex Downs.—Beautiful old-world COTTAGE RESIDENCE vacant; wealth of old oak. Magnificent views. 8 rooms. Offices. Indoor sanitation. Telephone. Garage. London 40-50 miles.—Owner, Rudale, Dee Banks, Chester.

Hendon.—Attractive Doctor's Resi- DENCE occupying important corner position, with special surgery entrance. 3 reception, 5 bedrooms, bath, &c. Billiards room (suitable for Laboratory or extra bedrooms). Garage space. Long lease. Price £1650—a bargain.—Bradstreet and Co., F.A.I., 25, The Promenade, Hendon Central. Hendon 1188.

Freehold House, centrally situated in growing and beautiful neighbourhood; close to station, shops, bus routes; 7 rooms exclusive of good lounge hall and useful attic; garden, secluded, quiet; electricity, gas, company's water. £1500. Immediate or later possession.—Owner: "Wilmore," Hill-avenue, Amersham.

Good Freehold House and Garden for Sale in best Residential part of large Seaside Resort in South-West of England. Has been a Doctor's house for over thirty years.
Further particulars on application.
Address, No. 654, THE LANCET Office, 423, Strand, W.C.2.

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Clinical Pathologist's Laboratory in Harley-street to Let. Rent £110 per annum, including usual service. Moderate price accepted for complete equipment, or for fixtures only. Pathologist is going abroad.—Address, No. 653, THE LANCET Office, 423, Strand, W.C.2.

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Cornwall.—About £850 p.a., increasing. Small panel. Visits 4/- to 21/-. House, 6 bed., &c., and good garden.—No. 8529.

Staffs.—About £1300 p.a. Panel 1300. Fees 5/-. House, 5 bed., &c., to rent. Prem. £1000 cash.—No. 8527.

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(Founded 1880)

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2. MIDLANDS.—In a clean thriving Hospital town (pop. 130,000) an old-estab. mixed-class PRACTICE worth last year £1100, including panel producing over £400 p.a. and £150 from Public Medical Service. Large house with ample accommodation, good garage, garden, &c. Vendor's leasehold having 31 years' unexpired (ground rent £9 16s.). Price £1500. Premium £1650.
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4. NEW ZEALAND. (South Island).—In a delightful and popular Seaside Resort (pop. town over 17,000 and country 5000 and greatly augmented by visitors) on main line, a well-estab. PRACTICE averaging £1816 p.a. for the past 5 years, including about £175 from lodges. Consultations fees 10s. 6d. Mid. 4 to 10 gns. 75 cases p.a. House is situated in excellent position and contains 14 rooms with ½ an acre of garden, tennis court, &c. Can be leased. Excellent educational facilities. Sport of all kinds.
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7. LONDON, WEST.—Good-class General PRACTICE, held by Vendor for the past 25 years. Gross cash receipts for past 3 years average £1682. Fees 10s. 6d. to 2 gns. Only a few Midwifery cases at from 10 to 20 gns. Good house with 3 public and 6 bedrooms, &c. Electric light. Garden. Garage. Rent on lease £150. Premium £2750.
8. HOME COUNTY.—Within 40 miles of London. Good Country PRACTICE estab. over 100 years, in very attractive district within 10 miles of favourite county town. Patients include many county families. Income for immediate past year nearly £1400, including transferable appts. worth about £120 and panel of 750, producing with mileage £470. Fees from 2s. to 21s. Little Midwifery. Excellent house with 3 reception, 5 bedrooms, &c. Good garden. Garage. Rented on lease at £80 p.a. Premium £2200.
9. CORNWALL.—FAVOURITE COAST TOWN.—PARTNERSHIP.—A one-third share is offered in a well-estab. Practice, having good surgical scope. Average gross cash receipts £4200 p.a. Panel of about 1800 and good appts. Very nice house available on rental, or smaller house or rooms could be taken. Hospital and prospect of appt. on staff. Premium £2400.
10. PARTNERSHIP.—SOUTH-EAST COAST.—A one-third share (with increase later) is offered in a well-estab. non-dispensing Practice situated in a popular Residential Town and Health Resort. Receipts for past 3 years average over £3000, with good scope. Fees from 5s. to 21s. Very little Mid. Attractive house with 4 reception, 6 bedrooms, &c. Garden. Garage. Premium 2 years' purchase.
11. SOUTH-WEST OF ENGLAND.—Seaport Town.—PARTNERSHIP.—A one-sixth share is offered in a very old-estab. sound mixed-class Practice situated in residential outlying suburb. Average gross cash receipts for past 3 years over £6700, including panel of 4000 and appts. worth about £750. Excellent house, property of retiring partner, can be bought, or purchaser can select his own residence. Good sport and schools. Premium 2 years' purchase.
12. SOUTH DEVON.—PARTNERSHIP.—A four-ninths share is offered in a very sound Country Practice in delightful district within easy reach of sea, moors, and Cathedral City. Average gross cash receipts for past 3 years £2458. Panel of 1400 and appts. worth about £200. Fees 3s. 6d. to 21s. Not much Midwifery at from 3 gns. Good house with 3 reception, 6 bedrooms, &c. Electric light. Garden of ¼ acre. Garage for 2 cars. Rent on lease £75 p.a. Premium 2 years' purchase.
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19. BORDERS OF WARWICK AND OXON.—Old-estab. Country PRACTICE, in attractive district near two good towns. Average income for past three years £1157, including panel of 580 and appts. worth over £100. Fees 2s. 6d. to 21s. Good house with 2 sitting, 4 bedrooms, &c. Separate entrance to surgery. Garden. Garage. Price for freehold £1250. Hunting, golf, and schools within reach. Premium 1½ years' purchase.
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